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PROGRESS REPORT 157

PENNSYLVANIA GEOLOGICAL SURVEY
FOURTH SERIES

OIL AND GAS DEVELOPMENTS IN PENNSYLVANIA IN 1959

By
Wm. S. Lytle, John M. Bergsten
Addison S. Cate, Walter R. Wagner

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF INTERNAL AFFAIRS
GENEVIEVE BLATT, *Secretary*
TOPOGRAPHIC AND GEOLOGIC SURVEY
CARLYLE GRAY, *State Geologist*
1960

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CONTENTS

Page

ABSTRACT 1

INTRODUCTION 2

ACKNOWLEDGMENTS 5

DEEP-SAND DEVELOPMENTS 5
  Summary of recent developments in the Clearfield County Area 8
  Activities in other fields 10

SHALLOW-SAND DEVELOPMENTS 16
  Shallow-sand gas developments 23
  Shallow-sand oil developments 23

SUMMARY AND FUTURE POSSIBILITIES 26

ARTICLES ON PENNSYLVANIA GEOLOGY, 1959 50

ILLUSTRATIONS

Plates

Plate 1. Pre-Upper Devonian Stratigraphy of the Kardosh No. 1 well. 6

2. Structure contour map of the Boone Mt. Pool and parts of the Rockton and Benezette-Driftwood Pools 9

3. Blocks for offshore gas and oil leasing 11

4. Columnar sections showing stratigraphic positions of shallow oil and gas sands of western Pennsylvania 17

5. Shallow gas wells drilled in 1959 in Armstrong and part of Westmoreland Counties, Pennsylvania 22

6. Oil and gas map of Pennsylvania showing deep wells completed during 1959 55

Figures

Page
Figure 1. Annual rate of deep-sand exploration and development .. 7

2. Crude oil prices, production, and well completions Bradford Field 18

3. Crude oil production curve of Bradford District 19

4. Annual production of crude oil in Pennsylvania 25

5. Annual production of natural gas in Pennsylvania 26

Tables

Table 1. Deep and shallow well completion summary in Pennsylvania 3

2. Oil and gas production and reserves in Pennsylvania 1959 4

3. Oil wells and crude oil production in Pennsylvania by counties: 1957 (Revised) and 1958 4

4. Summary of deep well completions in Pennsylvania in 1959 8

5. Discoveries during 1959 in Pennsylvania 12

6. Exploratory tests in Pennsylvania in 1959 14

7. Shallow-sand well completions in Pennsylvania in 1959 ... 20

8. Shallow-sand wells deepened in Pennsylvania in 1959 21

9. Price of crude oil per barrel, 1959 24

10. Summarized record of deep wells drilled in Pennsylvania in 1959 28

11. Supplement to catalogue of deep well samples (Information Circular No. 16) January 1959 to January 1960 42

OIL AND GAS DEVELOPMENTS IN PENNSYLVANIA IN 1959

By

William S. Lytle, John M. Bergsten
Addison S. Cate and Walter R. Wagner

ABSTRACT

Increased interest in oil and gas exploration in Pennsylvania was shown during 1959, the Centennial Year of the Petroleum Industry. Exploration during the year resulted in the discovery of 1 new gas field and 6 new gas pools, the extension of several gas-producing areas, and the establishment of a new producing-depth record for the State.

A number of important dry exploratory tests were drilled during the year. Pennsylvania's second offshore well, in Lake Erie on Block No. 2, was plugged and abandoned after finding saltwater in the Gatesburg (Upper Cambrian) Formation. The Block No. 2 lease has been surrendered. A second well will probably be drilled on Block No. 1 lease during 1960. In the Seven Springs Field, Somerset County, a new pool wildcat was successful when Pa. Tract 75 No. 3 by Peoples Natural Gas Company found gas in the Onondaga chert (Middle Devonian) at 8,472 ft. - the deepest production in Pennsylvania. The well produced 10, 933 MCF of gas (without fracturing) at a rock pressure of 3,400 psi in 10 days, and is the discovery well in the Kooser Pool. Fayette County had the only new field discovery in 1959. The Mueller-Herr No. 1 well by Manufacturers Light and Heat Company found gas in the Onondaga chert on the Laurel Hill Anticline, resulting in the discovery of the Ohiopyle Field.

The greatest density of deep drilling was in the Clearfield County area where three pools were merged into one long field, the Punxsutawney-Driftwood Field, extending almost 50 miles in a northeast-southwest direction.

A new shallow-sand (Upper Devonian or younger) gas pool was discovered when the Earl Young No. 1 well was drilled by James Drilling Company in Clearfield County. Production was from the Fifth sand. As in 1958 the secondary-recovery projects in the Bradford Field and the development drilling in the gas fields dominated the shallow-sand drilling activity during 1959.

Completions of all wells drilled by the petroleum industry in Pennsylvania during 1959 totaled 750, 37 less than in 1958. Of the 750

current completions, 726 were in proven fields and 24 were exploratory tests. Of the 726 proven fields wells, 223 were oil, 297 were gas, 129 were water input, 7 were for gas storage and 70 were dry. Of the 223 oil wells, 213 were drilled in connection with secondary-recovery operations. Of the 24 exploratory tests, 7 were commercial gas producers and 17 were dry. Of the 401 completions not drilled for gas storage or secondary oil recovery, 87 were dry - a ratio of one non-commercial well to every 4.6 wells drilled. The total footage drilled, both shallow and deep, was 2,302,784 ft.

Exploratory tests totaled 24, resulting in the drilling of a total of 131,891 feet of hole, or an average per well of 5,495 feet. Of the 24 exploratory tests, 7 were successful and 17 were dry, giving a success ratio of one in 2.4. The 7 successes consisted of 1 new gas field discovery and 6 new gas pools.

Oil pipe line runs totaled 6,160,387 barrels, a decrease of 5% over 1958 runs. The 1959 oil production was gathered by 7 pipe line companies. Sixty-eight thousand barrels of distillate was produced. Proven oil reserves were estimated at 113,858,000 barrels as of December 31, 1959.

Gas produced totaled 118,862,000 MCF, compared with 104,974,000 MCF in 1958. Gas reserves were estimated at 1,051,972,000 MCF at the end of the year. The total reservoir capacity for storage of natural gas in Pennsylvania is 455,885,473 MCF.

More than 2,000,000 acres were leased during the year. Most of the leasing was done in the southwestern and northeastern sections of the State. There were 5,772 acres of State owned land leased at a yearly rental of $3.21 to $45.63 per acre and $.04 per MCF royalty. Nine million undeveloped acres are estimated to be under lease.

Seismic activity more than doubled since 1958. Operators have kept four seismic crews busy throughout the southwestern and northeastern parts of the State. More geological field parties have been active in 1959 than in the previous year. An airborne magnetometer survey of the Appalachian Basin area is being flown. The detailed air survey will cover 121,500 square miles and the aeromagnetic maps will be offered to oil and gas companies for purchase. Completion of the survey is scheduled for November, 1960.

INTRODUCTION

During 1959 the Petroleum Industry celebrated its one hundredth anniversary. Several anniversaries pertaining to the oil and gas industry were celebrated at Titusville, the site of Colonel Edwin L. Drake's famous well. Within a few years after the beginning of the Petroleum Industry interest shifted to areas other than Pennsylvania. During the past two years the oil and gas industry has shown increased interest in exploration in the State. This interest has resulted in the establishment of regional exploration offices (in Pittsburgh) by six major oil companies.

Pennsylvania's oil and gas developments during 1959 are summarized in this publication. Skeletal logs of the deep wells (those which reached rocks of Middle Devonian or older age) drilled during the year are recorded in Table 10. The logs are supplementary to those published in Bulletins M 31 and M 39, Progress Reports 150, 151, 154, and 155, Fourth Series of the Pennsylvania Bureau of Topographic and Geologic Survey. Bulletin M 31 includes those deep wells completed prior to 1950 while Bulletin M 39 includes those drilled during the period 1951 to 1954 inclusive. Logs of deep wells drilled from 1954 to 1959 have been published yearly in Progress Reports 150, 151, 154, and 155. Activities in the shallow sands (Upper Devonian or younger) drilled since 1950 are described in Progress Reports 135, 139, 143, 144, 147, 150, 151, 154, and 155 of the Survey.

A completion summary of both the deep and shallow wells drilled during 1959, exclusive of those drilled in connection with underground gas storage and secondary-recovery oil operations, is given in Table 1.

TABLE 1. DEEP AND SHALLOW-WELL COMPLETION SUMMARY, PENNSYLVANIA, 1959

	Oil	Gas	Dry	Total	Percent Successful
Exploratory tests	-	7	17	24	29
Development wells *	10	297	70	337	81
Total	10	304	87	401	78

*Does not include wells drilled in connection with underground gas storage or secondary-recovery oil operations.

Crude oil and natural gas production for the year and the oil and gas reserves as of December 31, 1959, are shown in Table 2.

TABLE 2. PRODUCTION AND RESERVES, PENNSYLVANIA, 1959

	1958	1959	Cumulative Total to 12/31/1959	Reserves 12/31/59
Oil (bbls.)	6,471,680	6,160,387	1,215,230,000	113,858,000
Gas (MCF)	104,974,000	118,862,000	7,290,749,000	1,051,972,000

Table 3 lists the number of active oil wells and the crude oil produced in Pennsylvania by counties for 1957 and 1958.

TABLE 3. OIL WELLS AND CRUDE OIL PRODUCTION IN PENNSYLVANIA BY COUNTIES: 1957 (Revised) and 1958*

	1957 (revised)		1958	
County	Number of producing oil wells	Crude oil production (bbls.)	Number of producing oil wells	Crude oil production (bbls.)
Allegheny	458	113,475	450	131,930
Armstrong	197	13,810	197	13,224
Beaver	182	15,966	175	13,534
Butler	2,689	183,130	2,638	173,107
Clarion	1,248	53,041	1,209	53,109
Crawford	618	30,366	618	34,646
Elk	705	28,664	705	26,425
Fayette	4	393	4	226
Forest	1,059	42,126	1,018	66,769
Greene	321	64,311	318	62,384
Indiana	1	-	1	-
Jefferson	94	3,939	91	3,488
McKean	31,021	6,507,229	30,267	4,894,723
Mercer	229	4,719	227	3,806
Potter	418	95,233	418	84,498
Tioga	16	1,074	16	1,197
Venango	18,732	509,142	18,394	451,555
Warren	9,256	239,930	8,421	290,583
Washington	903	185,538	887	180,261
	68,151	8,092,146	66,054	6,485,467

*Data from Bureau of Statistics, Department of Internal Affairs, Pennsylvania.

ACKNOWLEDGMENTS

In connection with the preparation of this review, the writers acknowledge the cooperation of Paul W. Garrett, Jr., the Bradford District Producers Association, the Northeastern Gas and Oil Scouts Association, and the Pennsylvania Bureau of Statistics. Virginia Fairall of the Pennsylvania Bureau of Topographic and Geologic Survey Staff did the drafting and assisted with the compiling of the data.

DEEP-SAND DEVELOPMENTS

Deep exploration in Pennsylvania during 1959 resulted in the discovery of one new gas field and five new gas pools, the extension of several gas-producing areas, and a new producing-depth record for the State; also a number of important dry exploratory tests were drilled during the year. A new producing-depth record for Pennsylvania was established in Somerset County in the Seven Springs Field when Pa. Tract 75 No. 3 well found gas production in the Onondaga (Middle Devonian) Formation at 8,472 feet. Pennsylvania's second offshore well in Lake Erie was plugged and abandoned after finding saltwater in the Gatesburg (Upper Cambrian) Formation. The greatest density of deep drilling operations was in the Clearfield County area where three pools, which had formerly been considered to be separate, were merged into one long field, the Punxsutawney-Driftwood Field, extending almost 50 miles in a northeast-southwest direction.

Skeletal logs of the deep wells completed in Pennsylvania during 1959 are recorded in Table 10; Plate 6 shows the locations of the deep wells. The pre-Upper Devonian stratigraphy of the Kardosh No. 1 well, the only well drilled to the Precambrian in Pennsylvania, is shown on Plate 1. By the end of 1959 a total of 1982 deep wells had been drilled in the State. Most of the drilling has taken place since 1930 when only 36 deep wells had been drilled. Of the 1982 deep wells drilled to date, 1,133 were gas wells, 2 were oil and gas wells, 777 were dry holes, and 70 were drilled for gas storage.

During 1959 there were 113 wells drilled to the Oriskany Formation or deeper; 86 were gas wells and 27 were dry holes. Another 5 were completed in the Onondaga chert; 3 of which produced gas. Four wells were abandoned in the Middle Devonian before reaching the Onondaga Formation. Of the 122 deep wells completed during the year, 95 wells were fractured and 85 of the fractured wells were completed as gas wells. The total open-flow capacities before fracturing amounted to 115,201 MCF of gas daily, compared with 558,152 MCF of gas per day after fracturing. Four gas wells were not fractured and their total initial open-flow amounted to 143,433 MCF of gas daily. One of these wells had a natural initial open-flow of 70,000 MCF of gas daily, while a second well produced

Pre-Upper Devonian Stratigraphy of KARDOSH No.1 Well

by M. L. Benedum & Arkansas-Louisiana Gas Co.

Summerhill Twp., Crawford Co., Pennsylvania

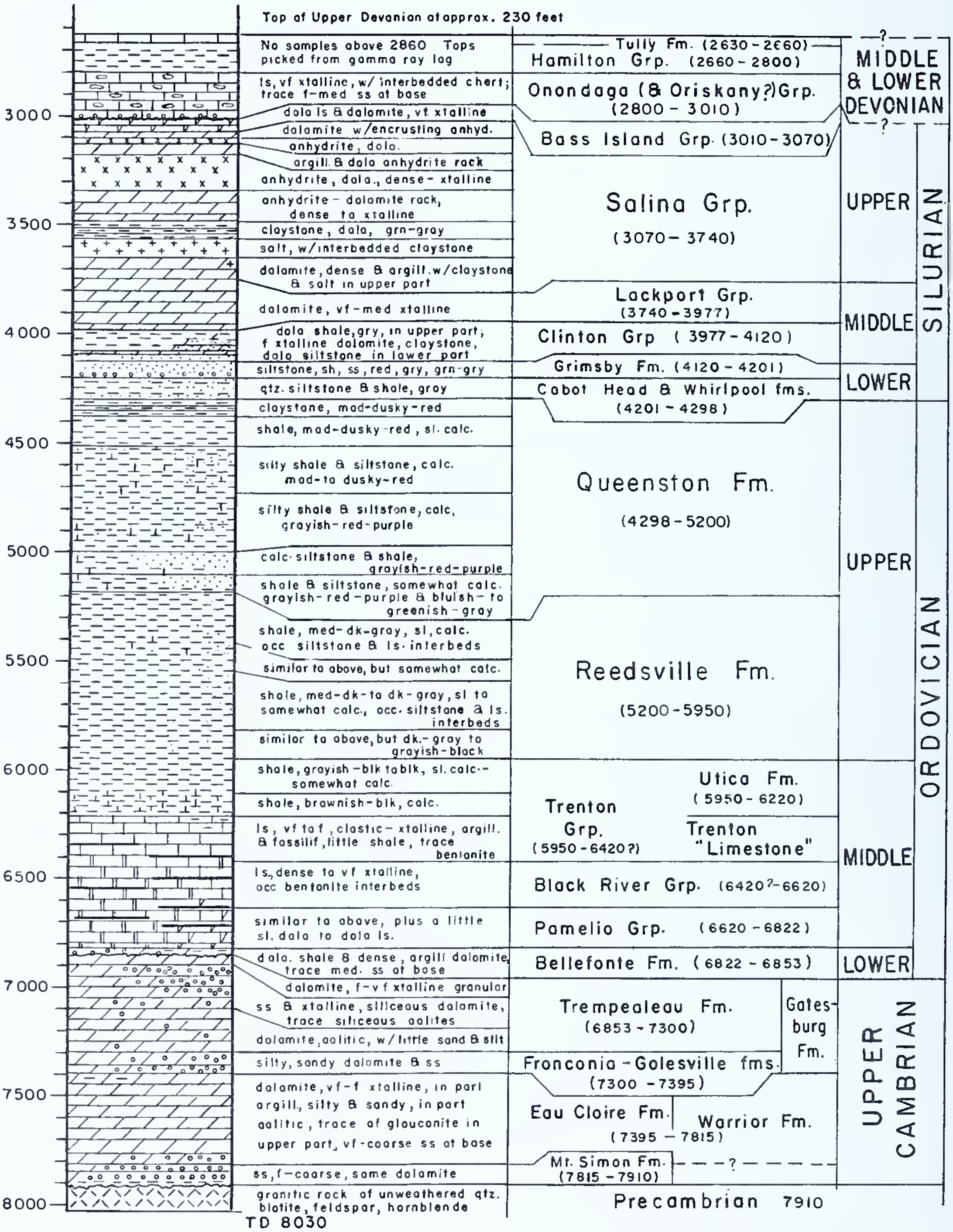
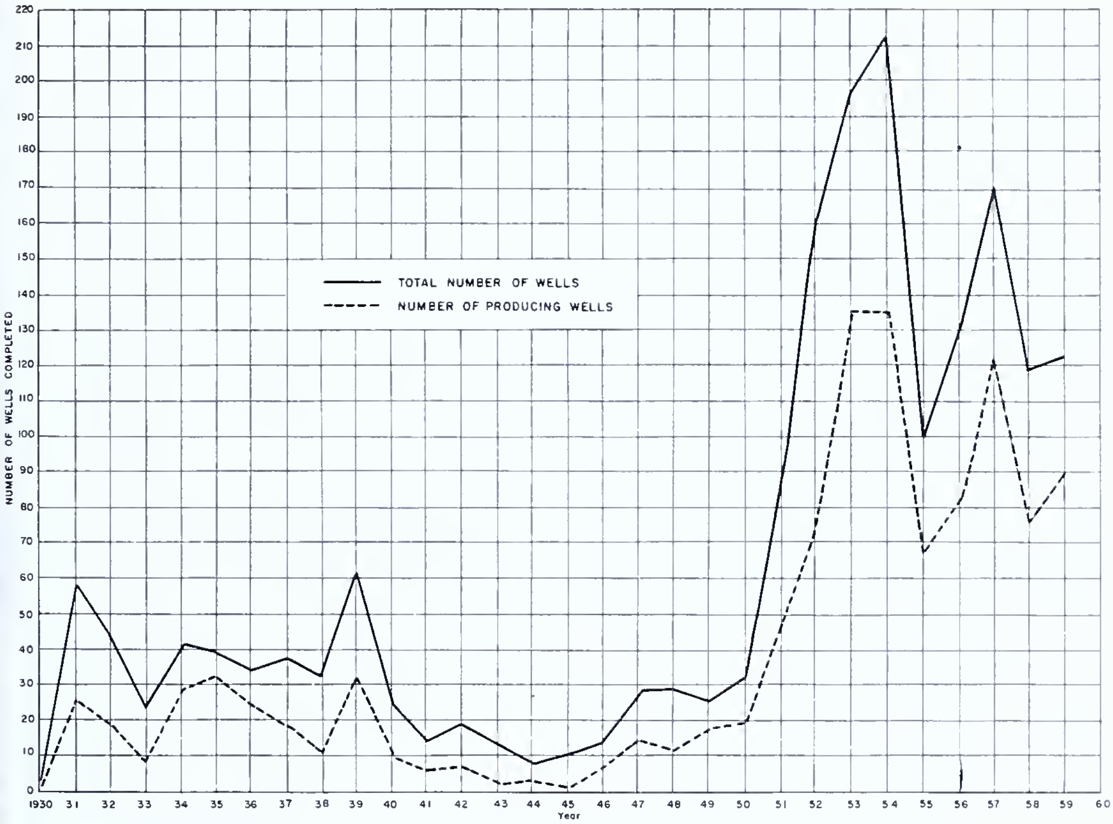

Top of Upper Devonian at approx. 230 feet
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
No samples above 2860 Tops picked from gamma ray log
ls, vf xtalline, w/ interbedded chert; trace f-med ss at base
dolo ls & dolomite, vf xtalline
dolomite w/encrusting anhyd.
anhydrite, dolo.
argill. & dolo anhydrite rock
anhydrite, dolo., dense- xtalline
anhydrite - dolomite rock, dense to xtalline
claystone, dolo, grn-gray
salt, w/interbedded claystone
dolomite, dense & argill. w/claystone & salt in upper part
dolomite, vf-med xtalline
dolo shale, gry, in upper part; f xtalline dolomite, claystone, dolo siltstone in lower part
siltstone, sh, ss, red, gry, grn-gry
qtz. siltstone & shale, gray
claystone, mod-dusky-red
shale, mod-dusky-red, sl. calc.
silty shale & siltstone, calc. mod-to dusky-red
silty shale & siltstone, calc, grayish-red-purple
calc. siltstone & shale, grayish-red-purple
shale & siltstone, somewhat calc. grayish-red-purple & bluish- to greenish-gray
shale, med-dk-gray, sl, calc. occ siltstone & ls. interbeds
similar to above, but somewhat calc.
shale, med-dk-to dk-gray, sl to somewhat calc., occ. siltstone & ls. interbeds
similar to above, but dk.-gray to grayish-black
shale, grayish-blk to blk, sl. calc.- somewhat calc.
shale, brownish-blk, calc.
ls, vf to f, clastic-xtalline, argill. & fossilif, little shale, trace bentonite
ls, dense to vf xtalline, occ bentonite interbeds
similar to above, plus a little sl. dolo to dolo ls.
dolo. shale & dense, argill dolomite, trace med. ss at base
dolomite, f-v f xtalline granular
ss & xtalline, siliceous dolomite, trace siliceous oolites
dolomite, oolitic, w/ little sand & silt
silty, sandy dolomite & ss
dolomite, vf-f xtalline, in part argill, silty & sandy, in part oolitic, trace of glauconite in upper part, vf-coarse ss at base
ss, f-coarse, some dolomite
granitic rock of unweathered qtz. biotite, feldspar, hornblende
TD 8030
Tully Fm. (2630-2660)
Hamilton Grp. (2660-2800)
Onondaga (& Oriskany?) Grp. (2800-3010)
Bass Island Grp. (3010-3070)
Salina Grp. (3070-3740)
Lockport Grp. (3740-3977)
Clinton Grp (3977-4120)
Grimsby Fm. (4120-4201)
Cabot Head & Whirlpool fms. (4201-4298)
Queenston Fm. (4298-5200)
Reedsville Fm. (5200-5950)
Trenton Grp. (5950-6420?)
Utica Fm. (5950-6220)
Trenton "Limestone"
Black River Grp. (6420?-6620)
Pamelio Grp. (6620-6822)
Bellefonte Fm. (6822-6853)
Trempealeau Fm. (6853-7300)
Gatesburg Fm.
Franconia-Galesville fms. (7300-7395)
Eau Claire Fm. (7395-7815)
Warrior Fm.
Mt. Simon Fm. (7815-7910)
?
Precambrian 7910
?
MIDDLE & LOWER DEVONIAN
?
UPPER
MIDDLE
LOWER
SILURIAN
UPPER
MIDDLE
LOWER
ORDOVICIAN
UPPER CAMBRIAN
W. R. Wagner
Jan. 1960

Plate I



ANNUAL RATE OF DEEP SAND EXPLORATION AND DEVELOPMENT

Figure 1

45,000 MCF. The total footage of deep wells drilled amounted to 850,025 feet. One hundred three of the deep wells completed during the year were drilled with rotary tools, most of these with air rotary, and 19 with cable tools.

In 1959 there were 122 deep wells completed, as compared with 119 in 1958. The greatest number of wells were completed in the Rockton Pool in Clearfield County where 39 gas producers and 4 dry holes were drilled. The Boone Mountain Pool in Clearfield County was second with 30 completions, 25 of which produced gas.

Table 4 summarizes the deep well completions in Pennsylvania during 1959. Figure 1 shows the annual rate of deep-sand exploration and development since the discovery of the Tioga Field in 1930, the first deep-sand field to be opened in Pennsylvania. The discoveries are listed in Table 5 and the more important dry exploratory tests in Table 6.

TABLE 4. SUMMARY OF DEEP WELL COMPLETIONS, PENNSYLVANIA, 1959

	Development		Wildcat		Total
Gas	83		6		89
Dry		16		17	33
Footage	608,603	111,523	37,792	92,107	850,025

Summary of Recent Developments In The Clearfield County Area

In 1959, as in 1958, the greatest density of "deep" drilling operations (to the Onondaga-Oriskany interval) in Pennsylvania was in the Clearfield County area.

The most significant development during the year in this area was the merging of the productive limits of three pools which had heretofore been considered to be separate. These three pools are: 1) the Benezette-Driftwood Pool to the north and on the Chestnut Ridge anticlinal trend, 2) the Rockton Pool to the south on the same anticlinal trend, and 3) the Boone Mountain Pool to the west and on the flank of the Sabinsville Anticline. The connection between accumulations on the two anticlines was discovered when producing wells were drilled on a divide in the Caledonia Syncline - the structural feature which separates the two anticlines (see Plate 2). The merging of these pools results in a field of production extending almost 50 miles in a northeast-southwest direction from western Cameron County to northeastern Indiana County; the field is now referred to as the Punxsutawney-Driftwood Field (only a portion of it is shown on Plate 2).

Production has been obtained on the facing flanks of the two parallel anticlines and also on the southwest plunge of the intervening Caledonia Syncline where a divide crosses it. In both the Boone Mountain and Rockton pools the structural limitations of production are rather similar; wells which found the top of the Oriskany at elevations somewhat above minus 5,750 feet, an elevation approximately that of the gas-water interface, were completed as gas wells. The water encountered in the wells in this area is connate water which does not provide the reservoir with an appreciable water drive. The upper limit to production in these two pools is not as easy to understand for it apparently is not primarily controlled by structure; the highest wells, for instance, have had to be abandoned without encountering more than a show of gas. The implication is left, therefore, that the upper limit to production is governed by the reservoir characteristics of the Onondaga-Oriskany lithologies.

Faulting is significant on the Chestnut Ridge Anticline, and its presence in the same degree has not yet (January, 1960) been encountered on the Sabinsville Anticline. Evidence of faulting other than of the reverse type has not been discovered. The magnitude of vertical displacement varies from insignificant amounts to as much as 300 feet. It may be possible to infer the presence of faults for which there is no other evidence than the isolation of certain areas with virgin pressures adjacent to areas from which gas has been withdrawn for a considerable period of time. The absence of complications in that part of the structure of the Sabinsville Anticline which has to date proved productive is quite apparent from the structure map (Plate 2). It may be considered predictable in this region that the degree of deformation decreases in a westward direction in folds related to the Appalachian Mountain system.

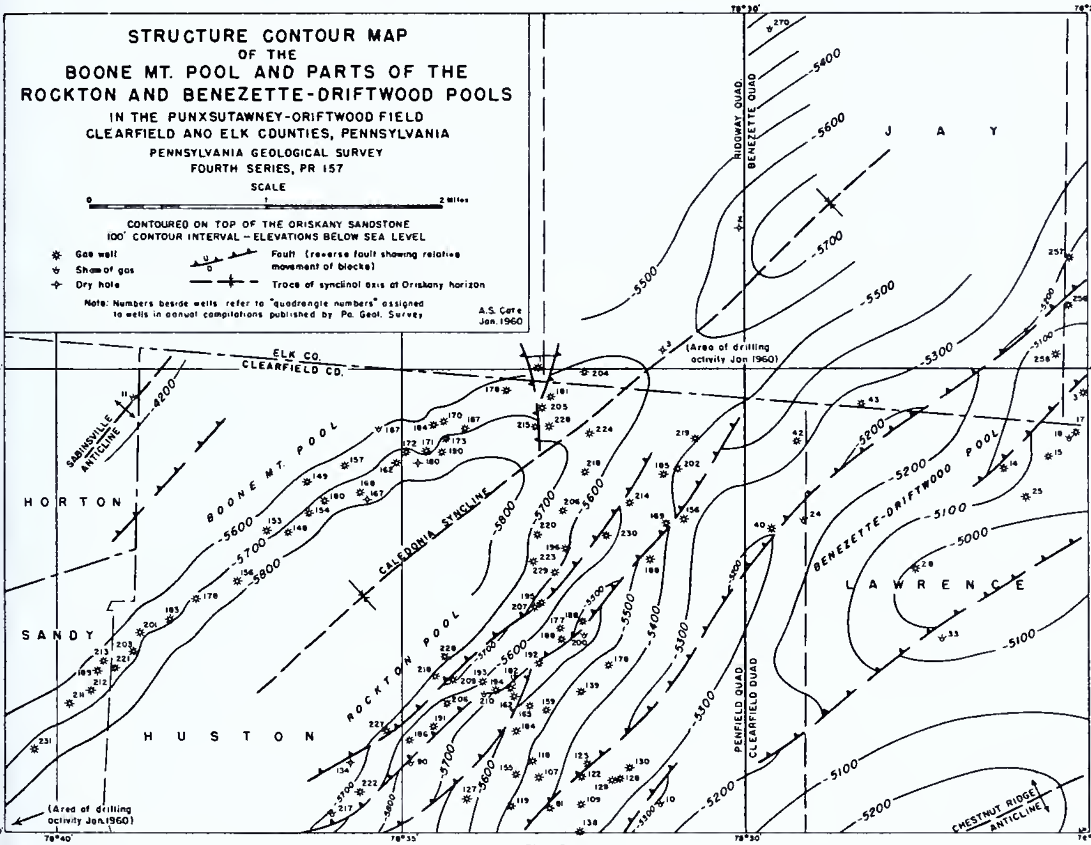

STRUCTURE CONTOUR MAP
OF THE
BOONE MT. POOL AND PARTS OF THE
ROCKTON AND BENEZETTE-DRIFTWOOD POOLS
IN THE PUNXSUTAWNEY-DRIFTWOOD FIELD
CLEARFIELD AND ELK COUNTIES, PENNSYLVANIA
PENNSYLVANIA GEOLOGICAL SURVEY
FOURTH SERIES, PR 157
SCALE
0
1
2 Miles
CONTOURED ON TOP OF THE ORISKANY SANDSTONE
100' CONTOUR INTERVAL – ELEVATIONS BELOW SEA LEVEL
Gas well
Show of gas
Dry hole
Fault (reverse fault showing relative movement of blocks)
U
D
Trace of synclinal axis at Oriskany horizon
Note: Numbers beside wells refer to "quadrangle numbers" assigned to wells in annual compilations published by Pa. Geol. Survey
A.S. Cate
Jan. 1960
78°30'
78°25'
RIDGWAY QUAD.
BENEZETTE QUAD.
-5400
-5600
J A Y
-5700
-5500
-5500
-5300
-5100
(Area of drilling activity Jan 1960)
ELK CO.
CLEARFIELD CO.
41°15'
SABINSVILLE ANTICLINE
-4200
BOONE MT. POOL
HORTON
-5600
-5700
-5800
CALEDONIA SYNCLINE
-5800
-5700
-5600
-5200
-5200
BENEZETTE-DRIFTWOOD POOL
-5100
-5000
LAWRENCE
-5100
SANDY
ROCKTON POOL
-5700
-5600
-5500
-5400
-5300
-5300
-5200
-5100
-5200
HUSTON
PENFIELD QUAD.
CLEARFIELD QUAD.
-5700
-5600
-5800
-5700
-5300
CHESTNUT RIDGE ANTICLINE
(Area of drilling activity Jan.1960)
41°10'
78°40'
78°35'
78°30'
78°25'

Plate 2

The stratigraphy of the Onondaga-Oriskany interval is not well enough understood to allow more than tentative hypotheses. As mentioned earlier, the nature of the reservoir rocks appears to limit the accumulation of gas in an up-dip direction. In the Boone Mountain Pool and the main part of the Rockton Pool both the Onondaga chert section and the subjacent Oriskany sandstone contribute gas to the production pipelines - the two kinds of rock are, in effect, treated as a single reservoir by production engineers. In the Benezette-Driftwood Pool to the northeast, however, only the Oriskany sandstone is considered to be productive. In this last-mentioned pool, water is generally encountered at elevations below minus

5,200 feet, and production is limited in an up-dip direction only by structural closure - a decided contrast with conditions noted in the pools to the south. This discrepancy in reservoir conditions of adjacent pools is doubtless related to stratigraphic changes in the area which are not well understood at this time. The critical area in which the reservoir condition change is in the vicinity of the junction of the Penfield, Clearfield, Ridgeway, and Benezette quadrangles.

It is worth noting that an isopach map of the Oriskany sandstone (Ridgeley Formation) in the area of Plate 2 indicates that the thickest accumulation of sandstone coincides (approximately) with the axis of the syncline and that the sandstone thins toward the flanks of the anticlines to the east and west - the lines of equal thickness being generally parallel to the structural contours. The area of production shown on Plate 2 has a range of sandstone thickness from 8 feet (in an up-dip edge well in the Rockton Pool) to about 34 feet (in several wells close to the axis of the plunging syncline). There are about 24 wells in the area shown on Plate 2 which had an initial open-flow potential (after fracturing) exceeding 10 million cubic feet of gas; almost all of these wells were in areas where the sand is thickest (30 feet or more) just above the water level and in low structural position.

Exploitation of the Boone Mountain Pool had proceeded, by the end of 1959, to the point where 34 wells were producing gas. The average potential per well (after fracturing) was more than 7 million cubic feet of gas; the initial reservoir pressure gauged at the well-head was about 3,850 psi.

The majority of drilling activity in the Punxsutawney-Driftwood Fielc during 1960 will be in search of the southeastern limit of the Boone Mountai Pool along the present trend on the east flank of the Sabinsville Anticline. The other two pools in the field have been almost completely developed.

Activities in Other Fields

Pennsylvania's second offshore well in Lake Erie was drilled on Block No. 2 (Plate 3 and Table 10) by New York State Natural Gas Corporation. The location was made by means of subsurface geology. Shows of gas were found in the Grimsby Formation (Lower Silurian) and in the Trenton Group(Middle Ordovician), and saltwater was encountered in the Gatesburg Formation (Upper Cambrian). The well was plugged and abandoned at a total depth of 4,741 feet. The Block No. 2 lease has been surrendered, but the Block No. 1 lease (at the western end of Pennsylvania's Lake Erie shoreline) is still held by New York State Natural Gas Corporation, and a second well will probably be drilled in this block during 1960. Erie County had 4 completions during 1959. Anna Packan No. 1 by World Wide Petroleum Company (Plate 6 and Table 10) was the discovery well in

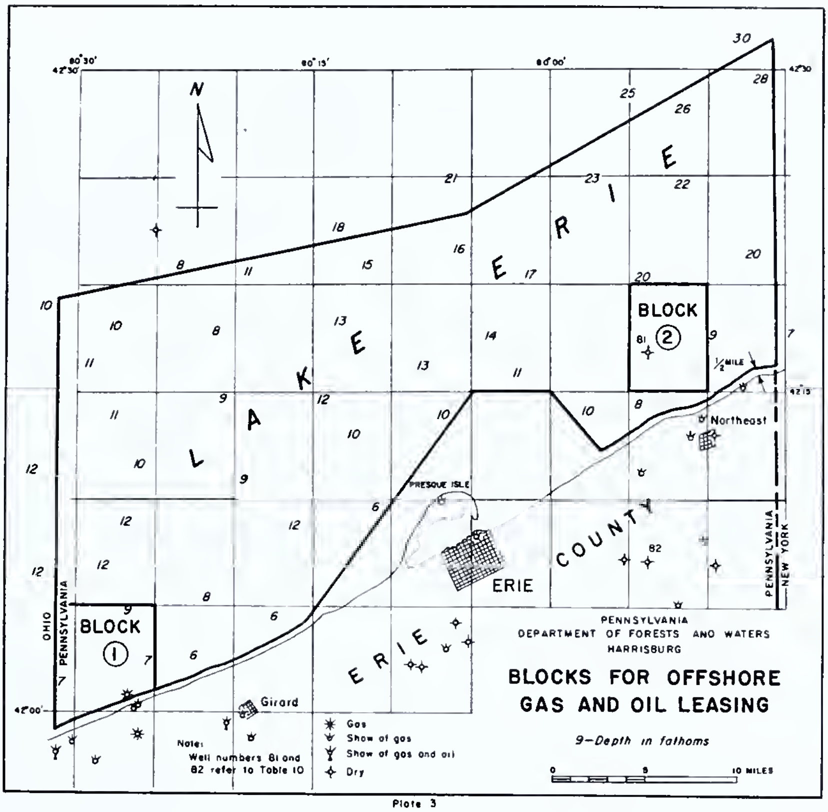


Plate 3

the Lexington Pool. The initial production amounted to 403 MCF of gas per day after plugging the well back to 3,115 feet from a total depth of 3,160 feet and fracturing the Grimsby Formation. The Carl Huston No. 1 well by Paul Britton, et al, in the Conneaut Pool, produced after fracturing, 2,200 MCF of gas per day from the Grimsby Formation at a rock pressure of 950 psi in 7 days. The other two completions in the county were dry holes. One was an unsuccessful outpost in the Phillipsville Field and the other an unsuccessful new field wildcat. Both wells reached the Helderberg Formation (Lower Devonian). The Meade Field in Erie County produced a total of 4,661,637 MCF of gas from the Oriskany sandstone from its discovery in 1954 up to June, 1959, when it was converted to a gas storage field.

In Crawford County one well was completed during the year. The Conneaut Valley Farms No. 1 by the Pennsylvania Gas Company found gas in the Grimsby Formation and was the discovery well of the Pennside Pool. The initial production after fracture was 499 MCF of gas daily at a rock pressure of 933 psi in 72 hours. Additional information has been released on a 1958 Crawford County completion - the Joe Kardosh No. 1 well. Some of the markers encountered in this well were the Onondaga Formation: 2,800 feet, Salina Group: 3,070 feet, Grimsby Formation: 4,120 feet, Queenston Formation: 4,298 feet, Trenton Limestone: 6,220 feet, Gatesburg Formation: 6,853 feet, and Precambrian: 7,910 feet. The total

TABLE 5. Important Discoveries in Pennsylvania, 1959

1 Map No.	2 Operator	3 Well Name	4 Well Location	5 Basis for Location	6 Comp. Date	7 Total Depth (Feet)	8 Prod. Depth (Feet)	9 Initial Oil -BOPD Gas-MCF/D	10 Prod. Formation	11 Deepest Formation Reached	12 Field or Pool	13 Expl. Cl.	14 Remarks
74	Penna. Gas Co.	Conneaut Valley Farms 1	Spring Tn. Crawford Co.	Sub. geol.	9/9/59	3537	3398	499 gas after frac.	Red Medina	Queenston	Pennside	NP	Disc. well, Pennside Pool, Medina play N. W. Pa. in Conneaut Field
85	World Wide Petroleum Co.	Anna Packan 1 (Korynoski)	Conneaut Tn. Erie Co.	Sub. geol.	9/26/59	3160	3095	403 gas after frac.	Red Medina	Red Medina	Lexington	NP	Disc. well Lexinton Pool, Medina play N. W. Pa. in Conneaut Field
86	Manufacturers Light & Heat Co.	Mueller-Herr 1	Stewart Tn. Fayette Co.	Seis.	12/28/59	7039	6841	4800 gas after frac.	Onondaga chert	Oriskany	Ohiopyle	NF	Disc. well in S. W. Pa. Laurel Hill Anticline
104	Phillips Petroleum Co.	Pa. Tract 81 well 1	Stewardson Tn. Potter Co.	Sub. geol. Seis.	1/9/59	6774	6744	983 gas after frac.	Oriskany	Oriskany	Ole Bull	NP	Disc. well Ole Bull Pool on N. W. flank Wellsboro Anticline in Leidy Field
108	Peoples Natural Gas Co.	Pa. Tract 75 well 3	Jefferson Tn. Somerset Co.	Sur. geol. Sub. geol. Seis.	5/19/59	8474	8472	10,933 gas natural	Onondaga chert	Onondaga chert	Kooser	NP	Dis. well Kooser Pool in S. W. Pa. Seven Springs Field on S. E. flank Laurel Hill Anticline
113	Felmont Oil Corp. & Peoples Nat. Gas Go.	R.S. Warnick 1	Quemahoning Tn. Somerset Co.	Sur. geol. Seis.	4/8/59	8808	8797	189 gas after frac.	Oriskany	Oriskany	Warnick	NP	Disc. well Warnick Pool in S. W. Pa. Boswell Field, Boswell Dome in separate fault block
Snallow well loc. not shown	James Drilling Co.	Earl Young 1	Huston Tn. Clearfield Co.	Sub. geol.	6/3/59	1992	1975	19,000 natural	Fifth	Fifth	Young	NP	Disc. well Young Pool, shallow-sand pool, Punxsutawney-Driftwood Field

depth of this well is 8,030 feet.

A successful new pool wildcat was completed on Pa. Tract 81 in Potter County by Phillips Petroleum Company. This well discovered the Ole Bull Pool in the Leidy Field when it found gas in the Oriskany sandstone at 6,744 feet. After fracturing, the well produced 983 MCF of gas per day at a rock pressure of 4,427 psi in 24 hours. The third well on this tract was completed as a small producer. Three other development wells in the pool were dry in the Oriskany. An unsuccessful new pool wildcat in the same general area found the Oriskany absent and was plugged and abandoned.

The Leidy Pool in the Leidy Field has been converted into a gas storage pool financed and operated by New York State Natural Gas Corporation, Transcontinental Gas Pipeline Corporation, and Texas Eastern Transmission Company. Actual storage of gas in the field has been started by Transcontinental Gas Pipeline Corporation. The Greenlick Pool and the Ole Bull Pool are the only pools now producing in the Leidy Field. The production from the Greenlick Pool amounted to 1,200,000 MCF of gas during the year, making the cumulative production figure of 48,100,000 MCF by the end of 1959. As of January 1, 1960, the cumulative total for the Leidy Field was 153,500,000 MCF of gas.

The Rockton Pool in the Punxsutawney-Driftwood Field, Clearfield County, had the most completions during the year with 39 gas wells and 4 dry holes extending the developed area to a total of 20,000 acres. Two large gas wells were completed in this pool: The Helen D. S. Gordon No. 11 (Plate 6 and Table 10) drilled by New York State Natural Gas Corporation had a natural initial gas production of 70,000 MCF daily at a rock pressure of 3,498 psi in 47 hours, and the Green Glen No. 1 by Lee Minter, et al, produced 45,000 MCF of gas per day with a rock pressure of 3,900 psi in 24 hours. This pool and the Reed-Deemer Pool to the southwest produced 14,000,000 MCF of gas during the year, making a cumulative total of 75,000,000 MCF of gas for this area. Development drilling in the Reed-Deemer Pool amounted to 2 gas wells and 2 dry holes.

The Boone Mountain Pool in the Punxsutawney-Driftwood Field had 30 completions of which 25 were gas producers and 5 were dry holes. By the end of 1959 this pool covered 2,000 acres and contained 34 producing gas wells. The average potential per well (after fracturing) was more than 7,000 MCF of gas; the initial rock pressure was about 3,850 psi.

West of the Benezette-Driftwood Pool on the east flank of the Sabinsville Anticline and north of the Boone Mountain Pool an unsuccessful new-field wildcat was drilled on the Dents Run Coal property by New York State Natural Gas Corporation. This well yielded a show of gas after fracturing the Oriskany sand but was plugged and abandoned. The gas production

TABLE 6. Important Dry Exploratory Tests in Pennsylvania, 1959

1 Map No.	2 Operator	3 Well Name	4 Well Location	5 Expl. Class	6 Basis for Location	7 Compl. Date	8 Total Depth (Feet)	9 Deepest Formation Reached	10 Remarks
1	New York State Nat. Gas Corp.	Aaron Morris 1	Monroe Tn. Bedford Co.	NPW	Sur. geol. Sub. geol.	9/19/59	5160	Hamilton	Mid-Dev. test in closely folded Appalachian Mts. S.-cen. Pa.
3	T. W. Phillips Gas & Oil Co.	Griffin Bros. 1	Franklin Tn. Butler Co.	NPW	Sub. geol.	6/11/59	5561	Oriskany	Low. Dev. test in W-cen. Pa.
7	New York State Nat. Gas Corp.	Dents Run Coal Co. 2	Benezette Tn. Elk Co.	NFW	Sur. geol. Sub. geol. Seis.	4/23/59	7000	Salina	Up. Silur. test, S. E. Flank Sabinsville Anticline
81	New York State Nat. Gas Corp.	Pa. Off-shore Block 2 Well 1	in Lake Erie Erie Co.	NFW	Sub. geol.	10/5/59	4741	Gatesburg	Up. Cambrian test in Pa. offshore Block 2
82	J. P. Pitonyak et al	Henderson 1	Greenfield Tn. Erie Co.	NFW	Sub. geol.	8/14/59	2605	Cobleskill	Up. Silur. test along Oriskany sandstone pinchout in N. E. Erie Co.
88	Manufacturers Light & Heat Co.	C. M. Stone 1	Stewart Tn. Fayette Co.	NPW	Seis.	12/31/59	8406	Onondaga	Mid. Dev. test in S. W. Pa. along axis of Laurel Hill Anticline
98	United Producing Co. Inc.	Parvin Good et ux 1	Dorrance Tn. Luzerne Co.	NFW	Sur. geol.	8/15/59	7583	Rose Hill	Mid. Silur. test in E.-cen. Pa. on axis of Kishacoquillas Anticline, found Oriskany absent
99	Jamestown Mfg. & Mch. Co.	Jamestown Mfg. & Mch. Co. 1	Jamestown Boro Mercer Co.	NPW	Sub. geol.	7/6/59	3060	Oriskany	Low. Dev. test in N. W. Pa.
100	Mercury Gas & Oil Co.	Vance Partridge 1	Perry Tn. Mercer Co.	NPW	Sub. geol.	11/20/59	3710	Oriskany	Low. Dev. test in N. W. Pa.
101	Transcontinental Produc. Co.	Jennie Haag 1	Greene Tn. Pike Co.	NFW	Sur. geol.	7/22/59	5990	Hamilton	Mid. Dev. test in N. E. Pa.
115	Kewanee Oil Co.	E. J. Moran 1	Friendsville Boro Susquehanna Co.	NFW	Sur. geol. Sub. geol.	12/12/59	5576	Helderberg	Low. Dev. test N. E. Pa. on Rome Anticline
117	T. D. Mallory et al	Fenner Lindbloom	Glade Tn. Warren Co.	NFW	Sur. geol. Sub. geol.	6/10/59	4751	Cobleskill	Up. Silur. test in N. W. Pa.
118	Transcontinental Produc. Co.	H. Heitmann 1	Manchester Tn. Wayne Co.	NFW	Sur. geol.	8/12/59	4990	Hamilton	Up. Dev. test in N. E. Pa. along N. Y. State Line.
119	Transcontin-	Grimm 1	Dyberry Tn.	NFW	Sur. geol.	3/30/59	4963	Hamilton	Up. Dev. test in N. E. Pa.

from the Benezette-Driftwood Pool comes from the Oriskany sandstone which is unlike the pools to the southwest on the same anticline where production comes from the Onondaga chert-Oriskany sandstone interval. The Benezette-Driftwood Pool produced 5,000,000 MCF of gas during the year, making the total cumulative production 217,000,000 MCF. The Hicks Run Pool, in the same general area, produced 400,000 MCF of gas in 1959; to date this pool has produced 2,200,000 MCF of gas. In southwestern Indiana County the Jacksonville Field, an Onondaga chert-Oriskany sandstone reservoir had 4 gas wells completed during the year. The average initial open-flow capacitites of the 4 gas wells was 1,333 MCF per day (after fracturing). This field produced 3,000,000 MCF of gas during the year, making the total cumulative production 14,000,000 MCF since the discovery in 1956. The Nolo Field to the east, which produces from the same interval, had 2 gas wells and 1 dry hole completed in 1959. The average initial open-flow capacities of the two wells was 955 MCF per day after fracturing. This field produced 1,800,000 MCF of gas during the year. To date production has amounted to 4,300,000 MCF of gas.

In Westmoreland County 3 gas wells were completed in the Blair Pool in the Seven Springs Field. The average initial open-flow capacities of these wells after fracturing was 5,387 MCF of gas per day. In Somerset County, and in the same field, a new pool wildcat was successful when the Pa. Tract 75 No. 3 by Peoples Natural Gas Company (Plate 6 and Table 10) found gas in the Onondaga chert at 8,472 feet. This is the deepest producing well in Pennsylvania. The well produced 10,933 MCF of gas (without fracturing) at a rock pressure of 3,400 psi in 10 days and is the discovery well in the Kooser Pool.

In addition to the above discovery, Somerset County had another new pool discovery - the Warnick Pool in the Boswell Field. The R. S. Warnick No. 1 by Felmont Oil Corporation and Peoples Natural Gas Company, a joint operation, found gas in the Onondaga chert-Oriskany sandstone interval. After fracturing, the well produced 189 MCF of gas per day with a rock pressure of 2,839 psi in 7 days. In the Boswell Pool 4 gas wells were completed in 1959 with average initial open-flow capacities of 3,800 MCF of gas per day. One development gas well was completed in the Williams Pool of the Johnstown Field.

Fayette County had the only new field discovery in 1959. The Mueller-Herr No. 1 well by Manufacturers L & H Company found gas in the Onondaga chert on the Laurel Hill Anticline, resulting in the discovery of the Ohiopyle Field. The chert was found at 6,841 feet, the Oriskany at 7,000 feet, and the well was bottomed at a total depth of 7,039 feet. After plugging back to and fracturing the chert the initial open-flow was 4,800 MCF of gas daily at a rock pressure of 3,450 psi in 162 hours. Bertha and E. G. Mueller No. 1 well extended the field when it found gas in the same interval. About 5 miles to the northeast on the same anticline this company completed a dry hole in the Onondaga chert. At the end of the year a second wildcat just east of the dry hole was being drilled to the same formation.

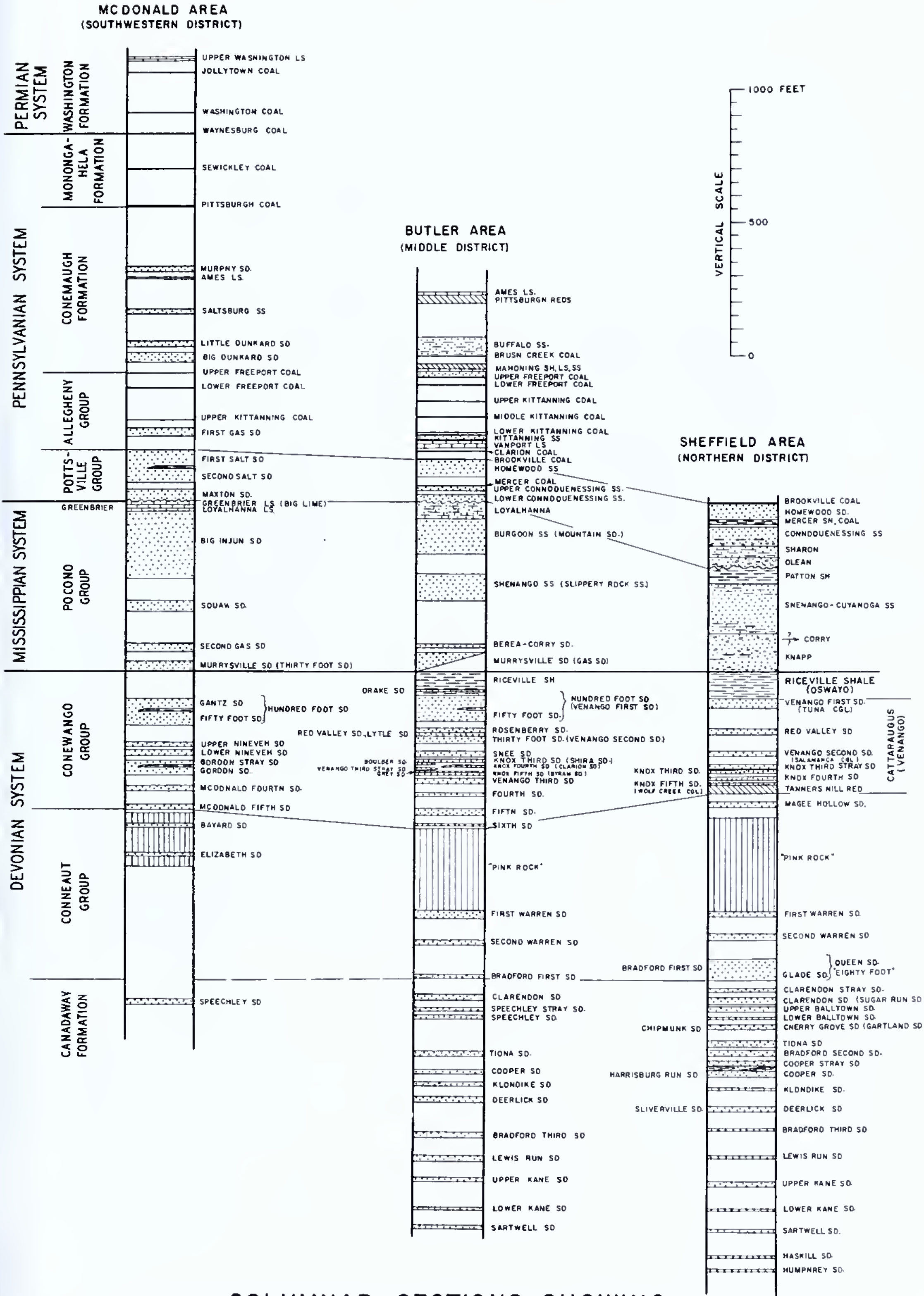
Two wildcats were drilled in each of Butler, Mercer and Wayne Counties. Their locations and logs are found on Plate 6, Table 6, and Table 10. The two wildcats in Butler County were drilled by T. W. Phillips Gas & Oil Company in search of gas in the Oriskany sandstone. Thes wells, located about 1,300 feet apart, found some gas in the sand but too much saltwater was encountered after fracturing and the wells were plugged and abandoned. Two unsuccessful new-field wildcats were drilled in Mercer County. Considerable saltwater was found in the Oriskany sandstone and the wells were plugged and abandoned. In Wayne County 2 new-field wildcats were also unsuccessful. The wells were plugged and abandoned after penetrating a few feet below the Tully Limestone.

Counties in which one wildcat was drilled during the year are Bedford, Luzerne, Pike, Susquehanna, Tioga, and Warren. The well locations and logs are found in Plate 6, Table 6, and Table 10. In an attempt to find a new pool in Bedford County a well was drilled on the Aaron Morris Farm. This is a highly faulted area in the closely folded Appalachian Mountains. An abnormally thick Upper and Middle Devonian interval was encountered and the well was plugged and abandoned after drilling into the Hamilton Formation. The Parvin Good et ux No. 1 well in Luzerne County found the Oriskany sandstone absent on the axis of the Kishacoquillas Anticline and was plugged and abandoned after reaching the Rose Hill Formation (Middle Silurian). In Pike County the Jennie Haag was plugged and abandoned after reaching the Hamilton Group (Middle Devonian). On the Rome Anticline in Susquehanna County the E. J. Moran No. 1 well was plugged and abandoned after reaching the Helderberg Formation (Lower Devonian). Wildcats in Tioga and Warren Counties were plugged and abandoned after finding the Oriskany sandstone dry.

SHALLOW-SAND DEVELOPMENTS

Drilling activity in the shallow-sand (Upper Devonian or younger) territory of western Pennsylvania showed a slight decline during 1959 fron that of 1958. In all, 628 shallow-sand wells were completed, as compare with 668 in 1958. Of these, 215 were gas wells, 10 were oil wells, 54 were dry holes, and 7 were drilled for underground storage of gas. Twenty-seven wells (3 storage wells included) were deepened - they were not related to secondary-recovery operations. Drilling in connection with secondary-recovery oil operations amounted to 342 new wells and 2 wells which were drilled deeper. The total footage for the new and deepened wells was 1,452,759 feet.

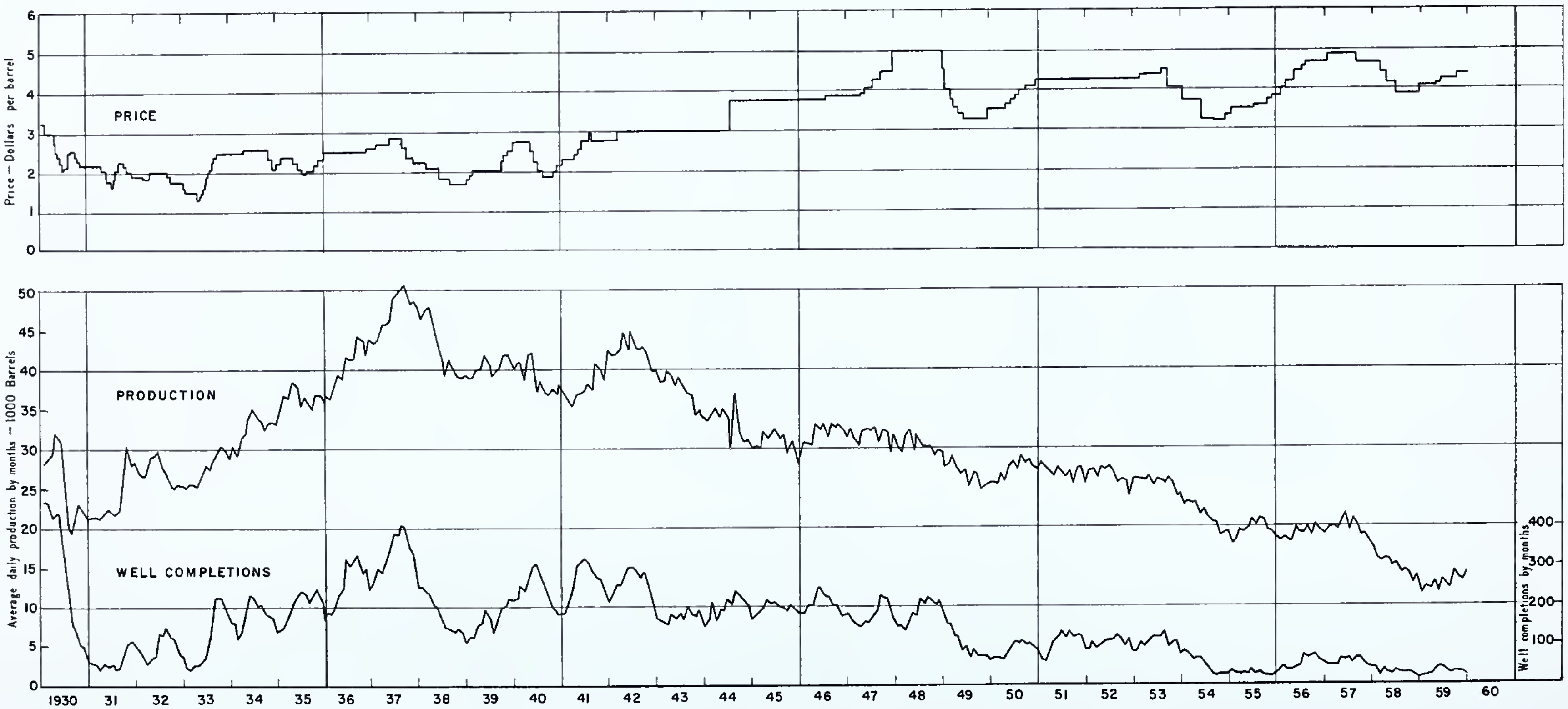
Shallow-sand well completions in western Pennsylvania, exclusive



COLUMNAR SECTIONS SHOWING
STRATIGRAPHIC POSITIONS OF OIL AND GAS SANDS
OF WESTERN PENNSYLVANIA

JOHN M BERGSTEN, 1959

Plate 4



CRUDE OIL PRICES, PRODUCTION AND WELL COMPLETIONS – BRADFORD FIELD

Figure 2

of those drilled for underground gas storage or secondary oil recovery are shown in Table 7. The results of deepening 24 shallow-sand wells in 1959 are shown in Table 8. The stratigraphic positions of the Upper Devonian or younger oil and gas sands of western Pennsylvania, from the southwest to northeast along the trend of the producing belt shown in Plate 6, are illustrated in the three columnar sections appearing in Plate 4.

The 215 new gas wells had a total initial open-flow capacity of 152,832 MCF per day, as compared with the total initial open-flow capacity of 142,357 MCF per day for the 258 gas wells completed in 1958. The figures used for 1959, as well as 1958, are those obtained after fracturing where that method of well completion was employed. One hundred seventy-six of the 215 new gas wells were fractured. The combined initial open-flow capacities of the 176 gas wells was 147,110 MCF per day after fracturing, as compared with 34,572 MCF per day before fracturing. Of the 21 gas wells deepened, 15 were fractured. The combined initial open-flow capacity of these 15 wells was 7,858 MCF per day after fracturing, as compared with 282 MCF daily before fracturing. The 10 new oil wells completed in 1959 had a total production of 55.5 barrels of crude oil per day, as compared with the total production of 71.7 barrels per day for the 24 new wells completed in 1958.

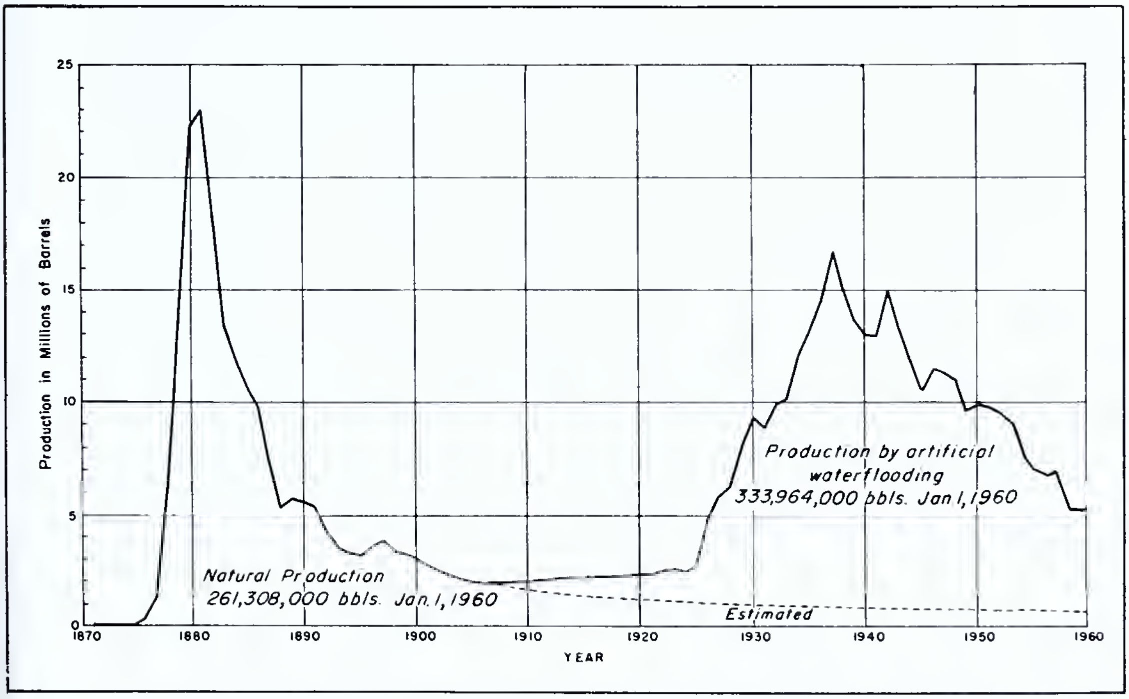


Fig. 3 Crude oil production curve of the Bradford district, Pa. & N.Y.
Music Mt. field excluded

TABLE 7. Shallow-sand Well Completions in Pennsylvania in 1959 *

County	TOTAL		GAS			OIL			DRY	
	No. of Wells	Aver. Total Depth (Feet)	No. of Wells	Aver. Init. Open-flow (M. cu. ft. per day)	Aver. Total Depth (Feet)	No. of Wells	Aver. Init. Prod. (bbls. per day)	Aver. Total Depth (Feet)	No. of Wells	Aver. Total Depth (Feet)
Armstrong	91	3161	86	619	3148	-	-	-	5	3385
Beaver	1	1640	-	-	-	-	-	-	1	1640
Butler	2	2056	1	762	1591	-	-	-	1	2520
Clarion	32	2495	28	294	2558	-	-	-	4	2050
Clearfield	2	1749	2	24,000	1749	-	-	-	-	-
Clinton	2	1264	1	286	1240	-	-	-	1	1287
Elk	13	2179	12	150	2171	-	-	-	1	2268
Fayette	3	3155	2	75	2917	-	-	-	1	3633
Forest	16	1448	8	34	1704	3	1.5	1015	5	1299
Greene	1	3012	-	-	-	-	-	-	1	3012
Indiana	22	3324	17	468	3507	-	-	-	5	2701
Jefferson	34	3071	26	391	3085	-	-	-	8	3023
Lackawanna	1	5532	-	-	-	-	-	-	1	5532
McKean	4	1994	3	20	2165	-	-	-	1	1480
Mercer	1	764	-	-	-	-	-	-	1	764
Potter	1	2010	1	25	2010	-	-	-	-	-
Tioga	1	1500	1	50	1500	-	-	-	-	-
Venango	4	857	-	-	-	3	2.7	981	1	485
Warren	4	746	-	-	-	4	10.8	746	-	-
Washington	8	2257	2	72	2533	-	-	-	6	2165
Westmoreland	36	3362	25	869	3283	-	-	-	11	3543
Total	279	2810	215	711	2936	10	5.6	897	54	2665

*Does not include wells drilled in connection with underground gas storage or secondary-recovery oil operations.

TABLE 8. SHALLOW-SAND WELLS DEEPENED IN PENNSYLVANIA IN 1959*

	TOTAL		GAS			OIL			DRY	
County	No. of Wells	Aver. Amount Deepened (feet)	No. of Wells	Aver. Init. Open Flow (MCF per day)	Aver. Amount Deepened (Feet)	No. of Wells	Aver. Init. Prod. (bbls. per day)	Aver. Amount Deepened (Feet)	No. of Wells	Aver. Amount Deepened (Feet)
Armstrong	11	947	9	415	1068	-	-	-	2	404
Butler	1	153	-	-	-	-	-	-	1	153
Clarion	2	1163	2	26	1163	-	-	-	-	-
Indiana	5	1908	5	950	1908	-	-	-	-	-
Jefferson	2	1929	2	905	1929	-	-	-	-	-
Westmoreland	3	817	3	131	817	-	-	-	-	-
Total	24	1198	21	512	1323	-	-	-	3	320

* Does not include wells drilled in connection with underground gas storage or secondary-recovery oil operations.

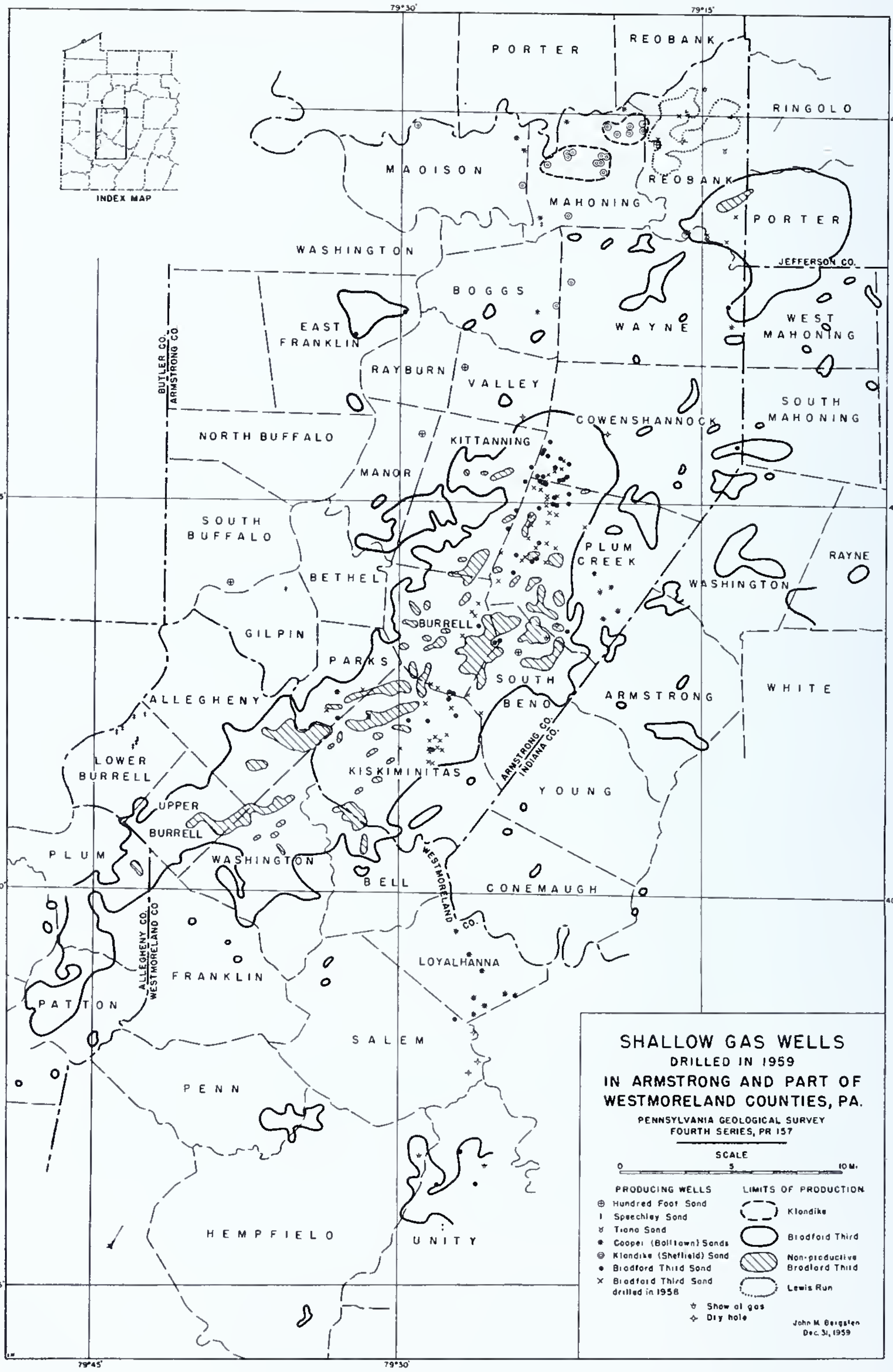

79°30'
79°15'
79°45'
41°00'
40°45'
40°30'
40°15'
INDEX MAP
PORTER
REDBANK
RINGOLD
MADISON
MAHONING
REDBANK
PORTER
JEFFERSON CO.
WASHINGTON
BOGGS
WAYNE
WEST MAHONING
EAST FRANKLIN
RAYBURN
VALLEY
SOUTH MAHONING
BUTLER CO.
ARMSTRONG CO.
NORTH BUFFALO
COWENSHANNOCK
KITTANNING
MANOR
SOUTH BUFFALO
PLUM CREEK
RAYNE
BETHEL
WASHINGTON
GILPIN
BURRELL
PARKS
SOUTH BEND
ARMSTRONG
WHITE
ALLEGHENY
LOWER BURRELL
KISKIMINITAS
ARMSTRONG CO.
INDIANA CO.
YOUNG
UPPER BURRELL
PLUM
WASHINGTON
BELL
WESTMORELAND CO.
CONEMAUGH
ALLEGHENY CO.
WESTMORELAND CO.
FRANKLIN
LOYALHANNA
PATTON
SALEM
PENN
HEMPFIELD
UNITY
SHALLOW GAS WELLS
DRILLED IN 1959
IN ARMSTRONG AND PART OF
WESTMORELAND COUNTIES, PA.
PENNSYLVANIA GEOLOGICAL SURVEY
FOURTH SERIES, PR 157
SCALE
0
5
10 Mi.
PRODUCING WELLS
⊕ Hundred Foot Sand
I Speechley Sand
Tiona Sand
Cooper (Balltown) Sands
Klondike (Sheffield) Sand
● Bradford Third Sand
× Bradford Third Sand drilled in 1958
Show of gas
Dry hole
LIMITS OF PRODUCTION
Klondike
Bradford Third
Non-productive Bradford Third
Lewis Run
John M. Bergsten
Dec. 31, 1959

Plate 5

Shallow-Sand Gas Developments

The Earl Young No. 1 well, drilled by the James Drilling Company in Huston Township, Clearfield County, was completed as a new pool wildcat in the Punxsutawney-Driftwood Field. The well produced from the Fifth sand 2200 MCF of gas per day after fracturing. The rock pressure was 520 psi in 72 hours. The well was completed at a total depth of 1,992 feet. A second gas well had been completed in this pool by the end of the year.

A successful outpost was completed in Blacklick Township, Indiana County; this well, drilled by T. W. Phillips Gas & Oil Company, was the H. Pershing No. 1. After reaching a total depth of 3,845 feet, the well was plugged back to 3,715 feet and the Bradford Third was fractured. Production amounted to 249 MCF after fracturing with a rock pressure of 1180 psi in 25 hours.

The primary targets for gas exploration in the shallow-sand fields continued to be the Speechley, Balltown, and Bradford Third sands (see Plate 5). As in the last three years, Armstrong County continued to support the greatest activity in the shallow-sand gas belt of western Pennsylvania. In Armstrong County 86 new gas wells were completed, of which 81 were fractured. Fracturing raised the combined initial open-flow capacities of the 81 new gas wells from 1,223 MCF per day to 52,837 MCF per day, an increase of more than 43 times. Other counties in which shallow-sand gas wells were drilled were Jefferson County, 23 wells; Westmoreland County, 21 wells; and Indiana County, 14 wells. Two gas wells were completed in Elk County in the Bond Pool. Seven wells were drilled for the underground storage of gas: 4 in the Bunola Storage Field and 1 in the Tepe Storage Field of Allegheny County and 2 in the Donegal Storage Field, Washington County.

Shallow-Sand Oil Developments

Three counties with a total of 10 oil wells accounted for all the oil wells drilled in Pennsylvania in 1959 aside from the secondary-recovery projects. These counties were Warren with 4 wells averaging 10.8 bbls. per day, Forest with 3 wells averaging 1.5 bbls. per day, and Venango with 3 wells averaging 2.7 bbls. per day.

The average daily oil production for the State during the year amounted to 16,878 bbls. as compared with 17,730 bbls. in 1958. As a result of increase in the price of crude oil, secondary-recovery projects which had been previously drilled were for the first time put into operation; this practice halted the rapid decline in production which had occurred in 1958. Crude-oil prices continued to increase throughout the year, as is shown below in Table 9.

TABLE 9. PRICE PER BARREL OF CRUDE OIL, 1959

Date	Northern or Bradford District	Middle or Venango District	Southwester District
January 1	$4.05	$3.87	$3.58
April 1	4.15	3.97	3.70
May 1	4.25	4.07	3.80
September 12	4.40	4.22	3.95

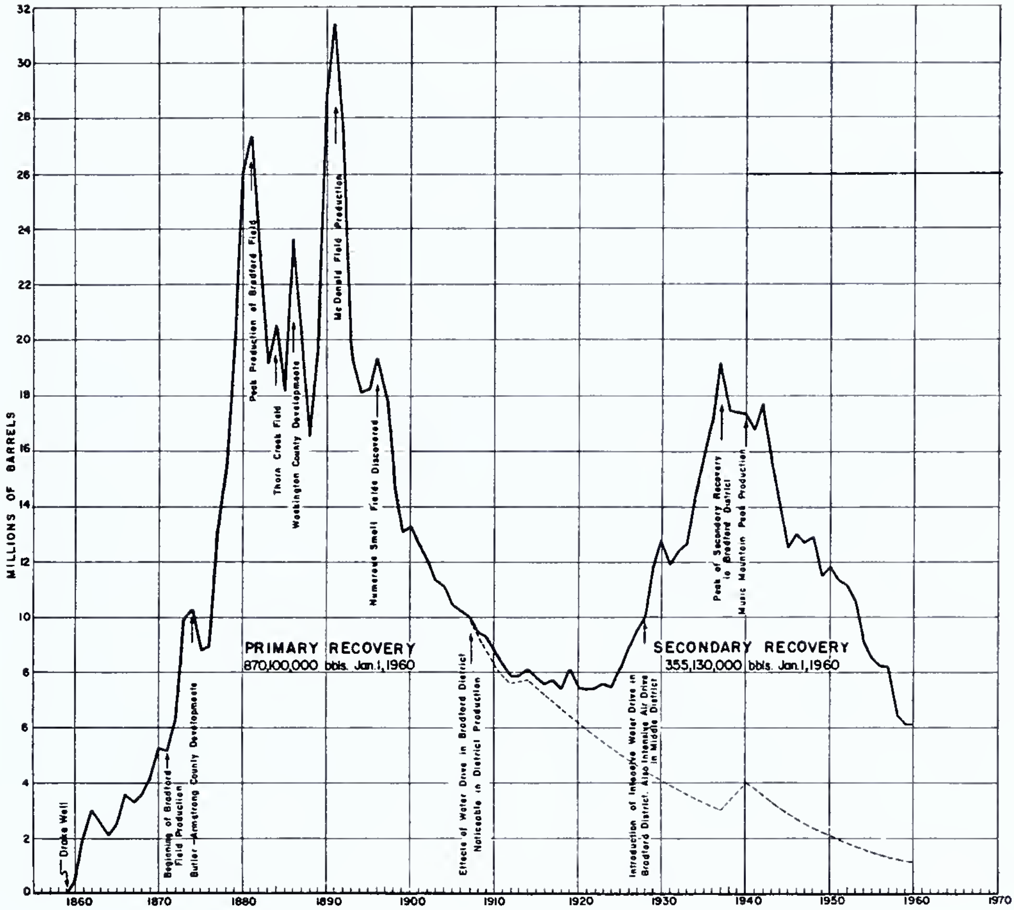
Statistics for the Bradford Field, which includes the Bradford, Guffey, and Burning Well pools, show that 365 new wells were drilled in 1959 in connection with secondary-recovery operations, as compared with 321 in 1958, an increase of 14 %. Oil production decreased from a daily average of 14,847 bbls. in 1958 to 14,360 bbls. in 1959, or more tha 3%. Eighty-six percent of the Bradford Field is in Pennsylvania. In the Pennsylvania part of the field 313 new wells were completed and productio amounted to 12,793 bbls. daily of crude oil, an amount which represents 76% of the total production in the State in 1959. Statistics on crude oil prices, production,and well completions since 1930 for the Bradford Field are shown in Figure 2. Figure 3 is the crude oil production curve of the Bradford District.

A total of 29 oil wells were drilled in other areas where secondary-recovery is practiced in the State. In southwestern McKean County and eastern Warren County, 23 oil wells were completed in the Kane-Clarendo Area. Only 3 new oil wells were drilled in 1959 in the Venango District of northern Venango County and adjacent parts of Warren County, as compared with 14 new oil wells in 1958.

The average daily oil production of the Middle and Southwestern districts of Pennsylvania was 4,085 bbls. in 1959, as compared with 4,481 bbls. in 1958, a decline of 9%. Nine wells were drilled in the Clough Field of central Forest County. Three of these wells produced oil, 2 produced gas, and 4 were dry holes.

No new shallow-sand oil fields or pools were discovered in Pennsylvania during the year. The annual production of crude oil in Pennsylvania since 1859 is shown on Figure 4.

A revised estimate of the amount of oil produced by primary and secondary recovery methods in Pennsylvania as of January 1, 1960 is



ANNUAL PRODUCTION OF CRUDE OIL IN PENNSYLVANIA

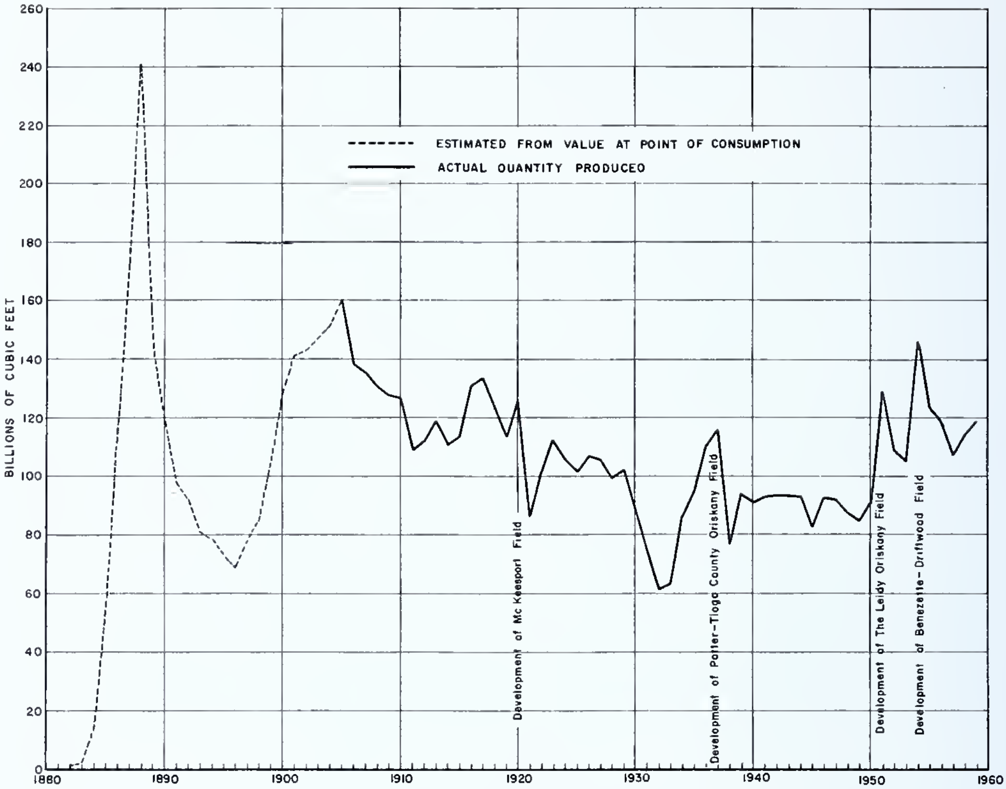
Figure 4

presented in the following paragraph in addition to other statistics.

The total crude oil recovered by secondary methods is 355,130,000 barrels. Of this amount 332,825,000 barrels were produced by water flooding and 22,305,000 barrels by air and gas drive. The total primary recovery is 870,100,000 barrels including an estimated 10,000,000 barrels which ran to waste in the early days (Figure 4). The Bradford District includes the Bradford Pool - 14 percent of this pool is in New York State - and the Guffy, and Burning Well pools. This district had produced about 595,272,000 barrels by January 1, 1960, of which 261,308,000 barrels can be attributed to primary production and 333,964,000 barrels to waterflood production (Figure 3).

The petroleum industry in Pennsylvania is operating approximately 90,000 wells - 24,000 are input wells in secondary-recovery projects and 66,000 are producing oil wells. About 39,000 of the above wells are producing naturally or under vacuum.

The Pennsylvania gas industry is operating about 20,000 gas wells.



ANNUAL PRODUCTION OF NATURAL GAS IN PENNSYLVANIA
Figure 5

SUMMARY AND FUTURE POSSIBILITIES

Increased interest was shown in exploring for oil and gas in Pennsylvania during 1959, the hundredth anniversary of the oil industry. This interest was shown by the establishment of offices in Pittsburgh by 6 major oil companies. Extensive seismic, geological, and leasing activity has been started by these companies and other major companies who have offices in the surrounding states. Over 2,000,000 acres were leased in Pennsylvania during 1959 for oil and gas exploration. Two of the companies drilled their first wells in the state during the year. Phillips Petroleum Company completed 4 wells in Potter County, discovering the Ole Bull Pool in the Leidy Field. Shell Oil Company drilled a development gas well in Elk County in the Rockton Pool and cored the Oriskany sandstone, the producing formation. The interest is not limited to just the Oriskany sandstone and the Medina section (Lower Silurian), from which most of the current gas production is being obtained, but the Ordovician and Cambrian rocks are also of increasing interest to the exploration companies. Figure 5 shows the annual production of natural gas in Pennsy vania.

At the year's end a well in Erie County penetrated the Gatesburg (Upper Cambrian) sandstone and found gas instead of the saltwater which 13 previous Gatesburg tests had found. This well is being tested and will be fractured. A well in Warren County found gas in the Medina section. This well is currently fishing for casing. A well drilled in Greene County on the Waynesburg Dome-Bellevernon Anticline found gas in the Onondaga chert-Oriskany sandstone section. An attempt is being made to complete this well as a commercial producer. North of Sunbury a well is being drilled in Northumberland County. The objective of this rank wildcat is the Oriskany sandstone. As soon as weather permits a second well will probably be drilled in 1960 on Pennsylvania's Offshore Block No. 1. The first well in this block found 200 MCF of gas in the Media section.

Development drilling during 1960 will be centered in the Punxsutawney-Driftwood Field where operators will be in search of the southwestern limit of theBoone Mountain Pool along the present trend on the east flank of the Sabinsville Anticline.

Seismic activity more than doubled since 1958. Operators have kept 4 seismic crews busy throughout the southwestern and northeastern parts of the State. More geological field parties have been active in 1959 than in the previous year. An airborne magnetometer survey of the Appalachian Basin area is being flown. The detailed air survey will cover 121,500 square miles and the aeromagnetic maps will be offered to oil and gas companies for purchase. Completion of the survey is scheduled for November, 1960.

TABLE 10

Summarized Record of Deep Wells Drilled in Pennsylvania in 1959

SHEET 1

TABLE 10 SUMMARIZED RECORDS OF DEEP WELLS DRILLED IN PENNSYLVANIA IN 1959

ELEVATIONS AND DEPTHS ARE IN FEET

COUNTY		Bedford	Butler	Butler	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield
MAP NUMBER		1	2	3	4	5	6	7	8	9	10
NAME OF WELL		Aaron Morris 1	J R Davis 1	Griffin Bros 1	R J Anderson 1	R J Anderson 2	Geo. J. Baummer 1	H. H. Bundy 1	M.W. Bundy 2	A.V. Crawford 1	L N Crawford 1
OPERATOR		New York State Nat. Gas Corp. 658	T.W. Phillips Gas & Oil Co	T. W. Phillips Gas & Oil Co.	James Drilling Co	James Drilling Co	New York State Nat Gas Corp. 737	Fairman Drilling Co.	James Drilling Co.	Sam Jack	New York State Nat Gas Corp. 697
TOWNSHIP		Monroe	Franklin	Franklin	Huston	Huston	Huston	Sandy	Huston	Huston	Huston
QUADRANGLE		Clearville 4	Zelienople 8	Zelienople 7	Penfield 170	Penfield 173	Penfield 219	Penfield 211	Penfield 187	Penfield 180	Penfield 171
LATITUDE		5100 ft N. 39° 50'	10,400 ft. S. 40° 55'	9100 ft S. 40° 55'	3400 ft. S. 41° 15'	4350 ft. S 41° 15'	4500 ft. S. 41° 15'	8400 ft. N. 41° 10'	3850 ft. S. 41° 15'	6100 ft. S. 41° 15'	5300 ft. S. 41° 15'
LONGITUDE		5500 ft W 78° 20'	10,500 ft E. 80° 05'	10,400 ft E. 80° 05'	2800 ft. E. 78° 35'	3000 ft. E. 78° 35'	3250 ft W. 78° 30'	400 ft. E 78° 40'	3900 ft. E. 78° 35'	1100 ft. E. 78° 35'	1600 ft. E 78° 35'
DATE COMPLETED		9 - 19 - 59	12 - 12 - 59	6 - 11 - 59	3 - 15 - 59	4 - 2 - 59	10 - 24 - 59	9 - 15 - 59	6 - 4 - 59	5 - 15 - 59	3 - 30 - 59
ELEVATION		1017 G	1315 G	1287 G	1679 G	1657 G	1716 DF	1636 G	1640 DF	1583 G	1606 G
TULLY				5190 -	6665 -	6693 -	6535 -	6664 -	6650 -	6665 -	6620 -
ONONDAGA			5452 - Chert, 5472 -	5415 - Chert, 5462 -	7261 - Chert, 7277 -	7300 - Chert, 7323 -	7167 - Chert, 7184 -	7236 - Chert, 7252 -	7250 - Chert, 7270 -	7275 -	7223 - Chert 7240 -
ORISKANY			5582 - 5611 2 Mcf gas 5582-84 5 qts SW 2 hrs	5539 - 1 Mcf gas BF at 5539	7323 - 1162 Mcf gas BF	7371 -	7225 - 7258 Gas 7227-7230	7304 -	7312 - Gas at 7315	7336 - SW at 7343	7287 - 7318 Gas, 7290-96
HELDERBERG											
SALINA											
LOCKPORT											
ALBION	RED MEDINA (GRIMSBY)										
	WHITE MEDINA (WHIRLPOOL)										
QUEENSTON											
TOTAL DEPTH		5160	5614	5561	7351	7401	7260	7333	7342	7346	7320
DEEPEST FORMATION REACHED		Hamilton	Helderberg	Oriskany	Oriskany	Oriskany	Helderberg	Oriskany	Oriskany	Oriskany	Helderberg
RESULT		Dry Oolitic Ls, 2380-92 - 2697-2702 Faulted Did not reach Oriskany	550 Mcf gas A F R P 950 psi, 18 hrs Too much SW Abandoned	83 Mcf gas AF R.P. B F 750 psi 18 hrs Too much SW Abandoned	7107 Mcf gas A F R.P. 3800 psi 56 hrs	12,600 Mcf gas A F R P 3800 psi 48 hrs.	3435 Mcf gas A F R P 3300 psi 42 hrs.	11,000 Mcf gas A F R.P. 3070 psi 72 hrs	8800 Mcf gas A F R P 3000 psi 24 hrs	1900 ft SW in 12 hrs. Completed as shallow gas well	15,313 Mcf gas A F R P 3380 psi 26 days

AF After Fracturing
BF Before Fracturing
PB Plugged back

DF Derrick Floor
G Ground
RT Rotary Table
TC Top of Cellar

TABLE 10
SHEET 2

SUMMARIZED RECORDS OF DEEP WELLS (continued)

COUNTY		Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield
MAP NUMBER		11	12	13	14	15	16	17	18	19	20
NAME OF WELL		L Desanders 1	Dubois Nat Bank 1	Gordon Gallagher 1	Mary E Gary 1	Mary E Gary 2	Patsy Georgina 1	Helen DS Gordon 8	Helen DS Gordon 9	Helen DS Gordon 10	Helen DS Gordon 11
OPERATOR		New York State Nat Gas Corp, 732	Harry Brunt et al	S W Jack	New York State Nat Gas Corp, 722	New York State Nat Gas Corp, 740	New York State Nat Gas Corp, 739	New York State Nat Gas Corp, 683	New York State Nat Gas Corp, 691	New York State Nat Gas Corp, 725	New York State Nat Gas Corp, 727
TOWNSHIP		Sandy	Huston	Huston	Huston	Huston	Huston	Huston	Huston	Huston	Huston
QUADRANGLE		Penfield 213	Penfield 218	Penfield 217	Penfield 209	Penfield 228	Penfield 226	Penfield 164	Penfield 163	Penfield 210	Penfield 191
LATITUDE		11,200 ft N 41° 10'	10,400 ft N 41° 10'	1200 ft N 41° 10'	10,100 ft N 41° 10'	11,800 ft N 41° 10'	3700 ft S 41° 15'	7000 ft N 41° 10'	9100 ft N 41° 10'	9100 ft N 41° 10'	7200 ft N 41° 10'
LONGITUDE		3000 ft E 78° 40'	2300 ft E 78° 35'	4600 ft W 78° 35'	3600 ft W 78° 35'	2900 ft E 78° 35'	9900 ft E 78° 35'	7900 ft E 78° 35'	7500 ft E 78° 35'	5500 ft E 78° 35'	1700 ft E 78° 35'
DATE COMPLETED		9 - 25 - 59	10 - 27 - 59	10 - 21 - 59	8 - 24 - 59	12 - 22 - 59	11 - 28 - 59	2 - 15 - 59	2 - 6 - 59	11 - 12 - 59	7 - 8 - 59
ELEVATION		1736 DF	1481 DF	1397 DF	1699 DF	1648 DF	1219 DF	1709	1631	1673 DF	1606 DF
TULLY		6717 -	6500 -	6415 -	6695 -	6696 -	6217 -	6599 -	6577 -	6595 -	6498 -
ONONDAGA		7299 - Chert, 7315 -	7102 - Chert, 7118 -	7008 - Chert, 7020 -	7344 - Chert, 7362 -	7306 - Chert, 7322 -	6816 - Chert, 6834 -	7225 - Chert, 7238 -	7268 - Chert, 7287 -	7257 - Chert, 7275 -	7085 - Chert, 7101 -
ORISKANY		7370 - 7402	7166 -	7080 -	7410 -	7368 -	6880 - 6914	7278 - 7302 Gas	7333 - 7365 Gas, 7335 - 37	7373 -	7147 -
HELDERBERG											
SALINA											
LOCKPORT											
ALBION	RED MEDINA (GRIMSBY)										
	WHITE MEDINA (WHIRLPOOL)										
QUEENSTON											
TOTAL DEPTH		7403	7181	7101	7415	7378	6915	7303	7366	7393	7164
DEEPEST FORMATION REACHED		Helderberg	Oriskany	Oriskany	Oriskany	Oriskany	Helderberg	Helderberg	Helderberg	Oriskany	Oriskany
RESULT		7,927 Mcf gas A F RP, BF, 3570 psi 36 hrs	5930 Mcf gas A F RP 2735 psi 45 hrs.	42 Mcf gas A F Abandoned	1233 Mcf gas A F R.P. 3425 psi 47 hrs	2491 Mcf gas A F RP 1710 psi 26 hrs.	15,920 Mcf gas A F R P 2235 psi 72 hrs.	2117 Mcf gas A F R.P. 1800 psi 19 hrs.	582 Mcf gas A F R P 3405 psi 72 hrs.	60 Mcf gas A F RP 1080 psi 10 hrs. Abandoned	70,000 Mcf gas natural R.P. 3498 psi 47 hrs.

TABLE 10
SHEET 3

SUMMARIZED RECORDS OF DEEP WELLS (continued)

COUNTY		Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield
MAP NUMBER		21	22	23	24	25	26	27	28	29	30
NAME OF WELL		Helen DS Gordon 12	Green Glen 1	Green Glen 1	Green Glen 2	Green Glen 3	Green Glen 4	Hylon Lewis 1	Hylon Lewis 2	Hylon Lewis (Weather) 1	M D Luchuck 1
OPERATOR		New York State Nat Gas Corp, 731	Fairman Drilling Co	Lee Minter et al	Lee Minter et al	Lee Minter et al	Lee Minter et al	Devonian Gas & Oil Co	Devonian Gas & Oil Co et al	Devonian Gas & Oil Co et al	James Drilling Co
TOWNSHIP		Huston	Union	Huston	Huston	Huston	Huston	Huston	Huston	Huston	Huston
QUADRANGLE		Penfield 208	Penfield 225	Penfield 186	Penfield 193	Penfield 207	Penfield 227	Penfield 182	Penfield 194	Penfield 203	Penfield 215
LATITUDE		8600 ft N. 41° 10'	9900 ft N. 41° 05'	6200 ft. N 41° 10'	10,100 ft. N. 41° 10'	15,300 ft S. 41° 15'	6600 ft. N 41° 10'	9700 ft. N 41° 10'	9600 ft N. 41° 10'	11,900 ft N. 41° 10'	3700 ft S 41° 15'
LONGITUDE		3000 ft. E. 78° 35'	2100 ft W. 78° 40'	1200 ft E 78° 35'	5400 ft E. 78° 35'	8900 ft E. 78° 35'	1100 ft W 78° 35'	7300 ft. E. 78° 35'	2300 ft E. 78° 35'	5000 ft E. 78° 40'	9000 ft E. 78° 35'
DATE COMPLETED		9 - 8 - 59	11 - 17 - 59	5 - 31 - 59	7 - 13 - 59	8 - 27 - 59	12 - 8 - 59	5 - 2 - 59	7 - 12 - 59	8 - 19 - 59	9 - 28 - 59
ELEVATION		1472 DF	1713 G	1692 G	1470 T.C	1500 G	1350 G	1630	1452 DF	1645	1278 DF
TULLY		6370 -	6625 -	6590 - 6697	6392 -	6425 - 6537	6398 - 6503	6560 -	6345 -	6676 -	6320 -
ONONDAGA		6959 - Chert, 6975 -	7258 - Chert, 7280 -	7172 - Chert, 7184 -	6991 - Chert, 7001 -	7025 - Chert, 7046 -	6998 - Chert, 7013 - Gas at 7015	7264 -	6943 - Chert, 6960 -	7247 - Chert, 7261 -	6920 - Chert, 6935 -
ORISKANY		7018 - 7049 Gas, 7030 - 32	7340 -	7232 - Gas at 7232	7061 - 7077	7097 -	7067 -	7326 -	7008 -	7322 -	6987 -
HELDERBERG											
SALINA											
LOCKPORT											
ALBION	RED MEDINA (GRIMSBY)										
	WHITE MEDINA (WHIRLPOOL)										
QUEENSTON											
TOTAL DEPTH		7050	7365	7236	7078	7112	7081	7333	7028	7351	6994
DEEPEST FORMATION REACHED		Helderberg	Helderberg	Oriskany	Helderberg	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany
RESULT		17,500 Mcf gas RP 2065 psi 10 days Did not frac.	2320 Mcf gas AF RP 1680 psi 48 hrs	Est 45,000 Mcf gas, natural RP 3900 psi 24 hrs	12,433 Mcf gas AF RP 3560 psi 24 hrs	1500 Mcf gas AF RP 2500 psi 12 hrs.	2050 Mcf gas AF RP 1475 psi 25 hrs	12,000 Mcf gas AF RP 3720 psi 37 hrs.	6625 Mcf gas AF RP 3680 psi 48 hrs	10,500 Mcf gas AF RP 3900 psi 48 hrs.	12,228 Mcf gas AF RP 3150 psi

TABLE 10
SHEET 4

SUMMARIZED RECORDS OF DEEP WELLS (continued)

COUNTY		Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield
MAP NUMBER		31	32	33	34	35	36	37	38	39	40
NAME OF WELL		Q D. Lucore 1	A. Malloney 1	J A Miller 1	Harvey Murray 1	New Shawmut (Warrant 5067) 2	New Shawmut (Warrant 5067) 3	New Shawmut (Warrant 5674) 1	New Shawmut (Warrant 5674) 2	Jos. Overturf 1	A J. Palumbo 1
OPERATOR		New York State Nat. Gas Corp, 689	Brunt et al	H S. McKay et al	New York State Nat Gas Corp, 685	Devonian Gas & Oil Co.	Devonian Gas & Oil Co.	Devonian Gas & Oil Co	Devonian Gas & Oil Co., et al	S W. Jack	New York State Nat Gas Corp, 694
TOWNSHIP		Huston	Sandy	Huston	Sandy	Huston	Huston	Huston	Huston	Huston	Huston
QUADRANGLE		Penfield 162	Penfield 212	Penfield 190	Penfield 198	Penfield 229	Penfield 168	Penfield 179	Penfield 188	Penfield 166	Penfield 169
LATITUDE		6000 ft. S 41° 15'	9200 ft. N. 41° 10'	5350 ft. S. 41° 15'	3500 ft N 41° 05'	13,300 ft. S 41° 15'	12,600 ft. S. 41° 15'	11,200 ft. N. 41° 10'	13,850 ft. N. 41° 10'	8100 ft. S 41° 15'	10,150 ft. S. 41° 15'
LONGITUDE		300 ft. W. 78° 35'	2200 ft. E. 78° 40'	2700 ft. E. 78° 35'	9300 ft W 78° 40'	10,200 ft. E. 78° 35'	6400 ft. W. 78° 30'	9150 ft. W. 78° 30'	10,900 ft. W 78° 30'	2800 ft. W. 78° 35'	5250 ft. W. 78° 30'
DATE COMPLETED		1 - 8 - 59	9 - 26 - 59	6 - 16 - 59	5 - 5 - 59	12 - 30 - 59	4 - 23 - 59	4 - 18 - 59	6 - 8 - 59	2 - 26 - 59	3 - 24 - 59
ELEVATION		1505	1668	1624 DF	1637 DF	1400	1599	1770	1445 G	1536 G	1517 DF
TULLY		6580 -	6706 -	6665 -	6625 -	6321 -	6375 -	6528 -	6275 -	6614 -	6304 -
ONONDAGA		7188 - Chert, 7206 -	7271 - Chert, 7290 -	7270 - Chert, 7288 -	7236 - Chert, 7247 -	6934 - Chert 6950 -	6993 - Chert, 7014 -	7139 - Chert, 7160 -	6879 - Chert, 6899 -	7200 - Chert, 7216 -	6989 - Chert, 7006 - Sand, 7031-7039
ORISKANY		7251 - 7285 Gas, 7253-7270	7343 - 7374	7333 - 7362 Gas at 7335	7303 - 7326 Salt water	7000 -	7057 -	7203 - 7227	6944 - 6973	7277 - 7300	
HELDERBERG											
SALINA											
LOCKPORT											
ALBION	RED MEDINA (GRIMSBY)										
	WHITE MEDINA (WHIRLPOOL)										
QUEENSTON											
TOTAL DEPTH		7285	7375	7365	7329	7025	7077	7228	6974	7312	7041
DEEPEST FORMATION REACHED		Helderberg	Helderberg	Helderberg	Helderberg	Oriskany	Oriskany	Helderberg	Helderberg	Helderberg	Onondaga
RESULT		14,534 Mcf gas natural R.P. 3850 psi 4 days	10,000 Mcf gas AF R P 3950 psi 6 days	3300 Mcf gas AF R P 1450 psi 24 hrs.	1387 Mcf gas AF RP 2080 psi, 5 days 100 gals. SW, 1 hr. Abandoned	2500 Mcf gas A F R.P. 1600 psi 48 hrs.	19,455 Mcf gas A F RP, B F, 3850 psi 7 hrs.	18,500 Mcf gas A F RP, BF, 2750 psi 18 hrs.	18,000 Mcf gas A F R.P. 3125 psi 24 hrs.	1500 Mcf gas A F R P 3550 psi 5 days	9690 Mcf gas A F RP, BF, 3850 psi

TABLE 10
SHEET 5

SUMMARIZED RECORDS OF DEEP WELLS (continued)

COUNTY		Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield
MAP NUMBER		41	42	43	44	45	46	47	48	49	50
NAME OF WELL		A. J. Palumbo 2	A.J Palumbo 3	A J Palumbo 4	A. J Palumbo 4	A J. Palumbo 5	AJ Palumbo 6	A J. Palumbo 7	A J. Palumbo 8	A J Palumbo 9	A J. Palumbo 10
OPERATOR		New York State Nat Gas Corp 704	New York State Nat Gas Corp, 714	New York State Nat Gas Corp, 718	New York State Nat Gas Corp, 687	New York State Nat Gas Corp 698	New York State Nat Gas Corp, 721	New York State Nat Gas Corp, 708	New York State Nat Gas Corp, 729	New York State Nat Gas Corp, 734	New York State Nat Gas Corp, 738
TOWNSHIP		Huston	Huston	Huston	Huston	Huston	Huston	Huston	Huston	Huston	Huston
QUADRANGLE		Penfield 177	Penfield 185	Penfield 214	Penfield 178	Penfield 176	Penfield 195	Penfield 181	Penfield 206	Penfield 216	Penfield 224
LATITUDE		16,700 ft S 41° 15'	6800 ft S 41° 15'	8700 ft. S 41° 15'	14,850 ft S 41° 15'	1300 ft S. 41° 15'	15,100 ft S. 41° 15'	1700 ft S 41° 15'	9200 ft. S 41° 15'	6600 ft S 41° 15'	4150 ft S 41° 15'
LONGITUDE		12,400 ft W. 78° 30'	5450 ft W 78° 30'	7750 ft W. 78° 30'	9200 ft. E 78° 40'	7000 ft E. 78° 35'	9400 ft E. 78° 35'	10,000 ft E 78° 35'	10,800 ft. E 78° 35'	10,700 ft W. 78° 30'	10,400 ft. W 78° 30'
DATE COMPLETED		4 - 21 - 59	5 - 20 - 59	9 - 27 - 59	4 - 22 - 59	4 - 11 - 59	7 - 12 - 59	5 - 13 - 59	8 - 27 - 59	10 - 9 - 59	11 - 14 - 59
ELEVATION		1583 G	1671G	1347	1564 G	1725 DF	1307	1491 DF	1670	1728 DF	1217 DF
TULLY		6461 –	6546 –	6230 -	6606 –	6649 -	6258 -	6449 -	6660 -	6665 -	6191 -
ONONDAGA		7067 – Chert, 7080 -	7181 – Chert, 7195 -	6852 - Chert, 6869 -	7208 Chert, 7225 -	7273 - Chert, 7291 –	6882, Chert, 6898 –	7052 – Chert, 7069 -	7276 - Chert, 7292 -	7276 - Chert, 7294 -	6800 - Chert, 6818 -
ORISKANY		7122 - 7147 Gas, 7122 - 7136	7238 - 7271 Gas, 7238-7245	6909 - 6942 Gas, 6910 -15	7272 - 7301 Gas at 7275	7338 - 7368 Gas, 7339 -44	6944 - 6974	7117 - 7145 Gas, 7117-7121	7331 - 7362	7337 –	6855 -
HELDERBERG											
SALINA											
LOCKPORT											
ALBION	RED MEDINA (GRIMSBY)										
	WHITE MEDINA (WHIRLPOOL)										
QUEENSTON											
TOTAL DEPTH		7153	7272	6943	7302	7369	6975	7146	7363	7368	6892
DEEPEST FORMATION REACHED		Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg
RESULT		37,500 Mcf gas A F R P 3420 psi 20 hrs	8660 Mcf gas A F R P 3700 psi 48 hrs	18,067 Mcf gas A F R P 2290 psi 19 hrs.	2312 Mcf gas A F RP, BF, 3790 psi 65 hrs	9690 Mcf gas A F R P 3875 psi 17 days	7500 Mcf gas A F R P 3070 psi 96 hrs	3373 Mcf gas A F R P 3645 psi 46 hrs	10,165 Mcf gas A F RP, BF, 3340 psi 64 hrs	15,313 Mcf gas A F R P 2980 psi 44 hrs	5731 Mcf gas A F RP, BF, 3330 psi 33 hrs

TABLE 10
SHEET 6

SUMMARIZED RECORDS OF DEEP WELLS (continued)

COUNTY	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield
MAP NUMBER	51	52	53	54	55	56	57	58	59	60
NAME OF WELL	James Parks 1	Pa Tract 65 3	Pa Tract 66 4	Pa Tract 76 5	Pa Tract 76 6	Pa Tract 76 7	Pa. Tract 76 8	Pa Tract 80 1	Pa Tract 86 1	Pa Tract 86 2
OPERATOR	Fairman Brothers	New York State Nat. Gas Corp, 726	New York State Nat. Gas Corp, 696	Manufacturers Light & Heat Co.	Manufacturers Light & Heat Co.	Manufacturers Light & Heat Co	Manufacturers Light & Heat Co.	New York State Nat Gas Corp, 719	New York State Nat Gas Corp, 723	New York State Nat Gas Corp, 733
TOWNSHIP	Huston	Huston	Huston	Huston	Huston	Huston	Huston	Huston	Huston	Huston
QUADRANGLE	Penfield 172	Penfield 201	Penfield 167	Penfield 189	Penfield 166	Penfield 200	Penfield 192	Penfield 197	Penfield 196	Penfield 220
LATITUDE	5400 ft S. 41° 15'	17,350 ft S. 41° 15'	8500 ft. S 41° 15'	12,800 ft. N 41° 10'	8200 ft N 41° 10'	13,000 ft. N 41° 10'	11,300 ft. N 41° 10'	3950 ft S 41° 15'	11,800 ft. S 41° 15'	10,800 ft. S. 41° 15'
LONGITUDE	300 ft. E. 78° 35'	5600 ft. E. 78° 40'	2250 ft. W 78° 35'	10,700 ft. E. 78° 35'	9300 ft. E 78° 35'	10,700 ft. W. 78° 30'	9200 ft E 78° 35'	1550 ft. W. 78° 35'	12,000 ft. W. 78° 30'	9100 ft. E. 78° 35'
DATE COMPLETED	3 - 30 - 59	7 - 31 - 59	2 - 22 - 59	6 - 17 - 59	2 - 5 - 59	7 - 17 - 59	7 - 9 - 59	10 - 7 - 59	7 - 13 - 59	11 - 2 - 59
ELEVATION	1596 G	1581 DF	1471	1609 DF	1720	1588 G	1348 G	1357	1697	1520 DF
TULLY	6641-	6599 -	6597-	6447 -	6560 - 6670	6380 - 6520	6220 - 6340	6292 -	6635 -	6505 -
ONONDAGA	7234 - Chert, 7252 -	7190 - Chert, 7208-	7194 - Chert, 7210 -	7061 - Chert, 7081 -	7222 - Chert, 7248 -	7217 - Chert, 7233 -	6918 - Chert, 6939 -	6894 - Chert, 6910-	7248 - Chert, 7273 -	7127 - Chert, 7143-
ORISKANY	7298 -	7258 - 7289	7258 - 7291 SW at 7260	7116 - 7149	7295 - 7320	7270 - 7305	6984 - 7010 Gas, 6987-	6958-6982	7312 - 7342 Gas, 7313-7316	7182 - 7213
HELDERBERG										
SALINA										
LOCKPORT										
ALBION RED MEDINA (GRIMSBY)										
WHITE MEDINA (WHIRLPOOL)										
QUEENSTON										
TOTAL DEPTH	7328	7290	7294	7150	7322	7306	7012	6983	7343	7214
DEEPEST FORMATION REACHED	Oriskany	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg
RESULT	7800 Mcf gas AF RP 1750 psi 12 hrs.	13,701 Mcf gas AF RP, BF 3800 psi 48 hrs	Dry	14,700 Mcf gas AF R.P. 2345 psi 25 hrs	720 Mcf gas AF RP, BF 1920 psi 67 hrs.	109 Mcf gas AF R.P. 1070 psi 48 hrs Abandoned	3890 Mcf gas AF R.P. 2750 psi 24 hrs.	33 Mcf gas AF 600 ft. SW Abandoned	13,357 Mcf gas AF RP 3310 psi 48 hrs.	4332 Mcf gas AF RP 2460 psi 48 hrs.

TABLE 10
SHEET 7

SUMMARIZED RECORDS OF DEEP WELLS (continued)

COUNTY		Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield
MAP NUMBER		61	62	63	64	65	66	67	68	69	70
NAME OF WELL		Pa Game Lands Tract 93, No 1	Pentz Estate 2	Pentz 3	Frank B Sherwood 1	Anna M Shutters 1	C W Spicher 1	James B Thompson 1	J R Thompson 1	Underhill (Warrant 5065) 4	C E Whitmore 1
OPERATOR		Fairman Drilling Co	Rockton Drilling Co.	Rockton Drilling Co	Lee Minter et al	James Drilling Co.	New York State Nat Gas Corp, 736	James Drilling Co	James Drilling Co	Devonian Gas & Oil Co	NYS NG Corp. 717 and Devonian G&O Co.
TOWNSHIP		Huston	Union	Union	Sandy	Huston	Huston	Huston	Huston	Huston	Huston
QUADRANGLE		Penfield 222	Penfield 174	Penfield 175	Penfield 199	Penfield 205	Penfield 221	Penfield 223	Penfield 184	Penfield 202	Penfield 183
LATITUDE		2700 ft. N 41° 10'	13,200 ft. N. 41° 05'	12,000 ft N. 41° 05'	10,600 ft N 41° 10'	2500 ft S 41° 15'	10,700 ft. N. 41° 10'	12,900 ft. S. 41° 15'	3600 ft. S. 41° 15'	6500 ft. S. 41° 15'	16,200 ft. S 41° 15'
LONGITUDE		2800 ft W 78° 35'	1100 ft. E. 78° 40'	800 ft. W. 78° 40'	3000 ft E 78° 40'	9400 ft E 78° 35'	3800 ft E. 78° 40'	8700 ft E. 78° 35'	2200 ft. E. 78° 35'	4500 ft. W. 78° 30'	7500 ft. E. 78° 40'
DATE COMPLETED		11 - 16 - 59	4 - 3 - 59	4 - 24 - 59	7 - 27 - 59	8 - 28 - 59	11 - 9 - 59	11 - 10 - 59	5 - 12 - 59	8 - 8 - 59	5 - 15 - 59
ELEVATION		1656	1731 DF	1733 DF	1778 DF	1327 DF	1620 DF	1428 DF	1695 DF	1715 DF	1670
TULLY		6648 -	6645 -	6600 -	6780 -	6295 -	6649 -	6440 -	6655 -	6525 -	6695 -
ONONDAGA		7242 - Chert, 7257 -	7262 -	7215 - Chert, 7226 -	7355 - Chert, 7370 -	6899 - Chert, 6920 -	7220 - Chert, 7236 -	7059 - 7083 Chert, 7083 -	7256 - 7275 Chert, 7275 -	7136 - Chert, 7152 -	7288 - Chert, 7300 -
ORISKANY		7305 -	7341 - 7361	7291 - 7311	7430 -	6958 -	7290 - 7319	7127 -	7328 -	7193 -	7347 - 7379 Gas
HELDERBERG											
SALINA											
LOCKPORT											
ALBION	RED MEDINA (GRIMSBY)										
	WHITE MEDINA (WHIRLPOOL)										
QUEENSTON											
TOTAL DEPTH		7322	7363	7331	7455	6988	7320	7132	7356	7218	7380
DEEPEST FORMATION REACHED		Oriskany	Helderberg	Helderberg	Oriskany	Oriskany	Helderberg	Oriskany	Oriskany	Oriskany	Helderberg
RESULT		2240 Mcf gas AF RP 1560 psi 24 hrs	6100 Mcf gas AF RP 1550 psi 6 hrs	7600 Mcf gas from chert and Oriskany RP 1660 psi 14 hrs	8992 Mcf gas AF RP 3760 psi 24 hrs	4100 Mcf gas AF RP, BF, 3070 psi 72 hrs	7504 Mcf gas AF RP, BF, 3230 psi 83 hrs	5440 Mcf gas AF RP 2460 psi	3456 Mcf gas AF RP 2900 psi 72 hrs	4000 Mcf gas AF RP 3000 psi 55 hrs	16,800 Mcf gas AF RP 3900 psi 72 hrs

TABLE 10
SHEET 8

SUMMARIZED RECORDS OF DEEP WELLS (continued)

COUNTY		Clearfield	Clearfield	Clearfield	Crawford	Elk	Elk	Elk	Elk	Elk	Elk
MAP NUMBER		71	72	73	74	75	76	77	78	79	80
NAME OF WELL		Underhill (Warrant 4899)	B.W. Irwin 2	Slimmer 8	Conneaut Valley Farms	B.W. Hewitt 1	Kaull & Hall 1	Palumbo 6	Dents Run Coal Co. No. 2	A J Palumbo 8	Pa Tract 83 1
OPERATOR		Devonian Gas & Oil Co	F C Deemer	F.C. Deemer	Pa. Gas Co No 1572	James Drilling Co	Fairman Drilling Co.	New York State Nat. Gas Corp, 707	New York State Nat Gas Corp, 679	New York State Nat. Gas Corp., 715	Shell Oil Co.
TOWNSHIP		Huston	Bell	Bell	Spring	Jay	Jay	Fox	Benezette	Jay	Jay
QUADRANGLE		Clearfield 42	Punxsutawney 32	Punxsutawney 33	Girard 32	Ridgway 3	Ridgway 2	Ridgway 1	Benezette 272	Penfield 204	Clearfield 43
LATITUDE		4650 ft. S. 41° 15'	10,000 ft. N. 40° 55'	7850 ft. S. 41° 00'	5200 ft. N. 41° 50'	1300 ft N 41° 15'	9300 ft. N 41° 15	50 ft. N. 41° 15'	13,800 ft. S. 41° 25'	150 ft S. 41° 15'	2450 ft. S. 41° 15'
LONGITUDE		3600 ft. E 78° 30'	8250 ft. W 78° 45'	9500 ft E. 78° 50'	5300 ft E 80° 25'	5500 ft. W. 78° 30'	350 ft W. 78° 30'	9100 ft. E 78° 35'	7900 ft. W. 78° 20'	10,700 ft. W 78° 30'	8000 ft. E 78° 30'
DATE COMPLETED		2 - 19 - 59	2 - 2 - 59	3 - 9 - 59	9 - 9 - 59	12 - 16 - 59	11 - 5 - 59	6 - 8 - 59	4 - 23 - 59	8 - 31 - 59	9 - 4 - 59
ELEVATION		1860	2059 G	1460	983 DF	1281 DF	1294 DF	1717 G	1457	1568 G	1279 DF
TULLY		6459 -	6805 -	6408 -	1952 - 1984	6190 -	6315 -	6630 -	6108 -	6512 -	5817 -
ONONDAGA		7113 - Chert, 7135 -	7512 - Chert, 7526 - Gas at 7530	7085 - Chert, 7099 -	2122 -	6790 - Chert, 6808 -	6918 - Chert, 6939 -	7278 - Chert, 7297 -	6723 - Chert, 6744 -	7112 - Chert, 7129 -	6485 - Chert, 6505 -
ORISKANY		7179 - 7202	7588 - 7596	7164 -	2395 - 2418	6856 - SG and SW	6973 - 7000	7352 - 7383	6773 - 6782	7180 - 7210	6538 -
HELDERBERG											6564 -
SALINA											
LOCKPORT											
ALBION	RED MEDINA (GRIMSBY)				3333 - 3422 Gas, 3398 - 3407						
	WHITE MEDINA (WHIRLPOOL)										
QUEENSTON					3509 -						
TOTAL DEPTH		7210	7605	7228	3537	6886	7020	7384	7000	7211	6588
DEEPEST FORMATION REACHED		Helderberg	Helderberg	Helderberg	Queenston	Helderberg	Helderberg	Helderberg	Salina	Helderberg	Helderberg
RESULT		500 Mcf gas AF RP 3200 psi 116 hrs.	1712 Mcf gas AF RP 3600 psi 36 hrs	100 Mcf gas AF Much SW Abandoned	499 Mcf gas AF RP 933 psi 72 hrs.	Show of gas in Oriskany RP 30 psi 24 hrs. 1000 ft. SW Abandoned	750 ft. SW. in 12 hrs. Abandoned	4150 Mcf gas AF RP 3360 psi 18 hrs	Plugged back to 6787 7 Mcf gas AF Abandoned	2665 Mcf gas AF RP 3540 psi 24 hrs.	1034 Mcf gas AF RP 3400 psi 15 days

TABLE 10
SHEET 9

SUMMARIZED RECORDS OF DEEP WELLS (continued)

COUNTY		Erie	Erie	Erie	Erie	Erie	Fayette	Fayette	Fayette	Indiana	Indiana
MAP NUMBER		81	82	83	84	85	86	87	88	89	90
NAME OF WELL		Pa Block 2 1	Henderson 1	E&K May 1	Carl Huston 1	Anna Packon (Korynoski) 1	Mueller-Herr 1	Bertha & E.G. Mueller, No 1	C.M. Stone 1	H B Brooks 1	N B Bowman 1
OPERATOR		New York State Nat Gas Corp, 664	J.P. Pitonyak et al	Pa. Gas Co. No 1584	Paul Britton et al	World Wide Petroleum Co.	Manufacturers L & H Co. 4522	Manufacturers L & H Co. 4557	Manufacturers L & H Co., 4519	J. I. Shearer	New York State Nat Gas Corp, 686
TOWNSHIP		in Lake Erie	Greenfield	Venango	Conneaut	Conneaut	Stewart	Henry Clay	Stewart	Banks	Armstrong
QUADRANGLE		N of NE 1	North East 22	North East 23	Girard 31	Girard 30	Confluence 2	Confluence 3	Confluence 4	Punxsutawney 35	Elders Ridge 37
LATITUDE		10,900 ft N 42° 15'	11,700 ft N 42° 05'	13,000 ft S 42° 05'	12,500 ft N. 41° 50'	5300 ft. N. 41° 55'	1800 ft N. 39° 50'	3200 ft N. 39° 50'	9000 ft S. 39° 55'	4300 ft S 40° 55'	9100 ft. N 40° 35'
LONGITUDE		4700 ft. E 79° 55'	5400 ft. E 79° 55'	10,200 ft E. 79° 55'	4500 ft W 80° 30'	6300 ft. W 80° 20'	7300 ft W. 79° 25'	2400 ft W. 79° 25'	2900 ft E. 79° 25'	9300 ft. W. 78° 50'	500 ft. W 79° 15'
DATE COMPLETED		10 - 5 - 59	8 - 14 - 59	10 - 22 - 59	9 - 18 - 59	9 - 26 - 59	12 - 28 - 59	12 - 31 - 59	12 - 31 - 59	8 - 19 - 59	1 - 16 - 59
ELEVATION		604 DF	1415 DF	1379 DF	958 DF	852	1762	2825	2655	1865 DF	1349
TULLY		832 – 935 SG at 843	2060 -	2171 –			Horizon 6295 -	Horizon, 7270 -	Hamilton, 7260-7720 Marcellus, 7720-8296	6740 –	7039 –
ONONDAGA		1050 – 1312	2315 -	2400 -	1920 -	1801 –	6825 - Chert, 6841 -	8285 – Chert, 8315 -	8296 - Chert, 8310 -	7416 - Chert, 7431 –	7616 – Chert 7631 – 160 Mcf gas at 7711
ORISKANY		Horizon 1312 –	2566 – 2571 SW at 2600-05	2648 - 2651	2212 – 2222 SG & SW at 2212	2072 - 2097 1500 ft SW at 2080	7000 -	8493 – 8611		7502 – 155 Mcf gas	7759 – 7775 46 Mcf gas
HELDERBERG		Bass Island ?1312 - ?									
SALINA		1382 – 1745			Salt, 2682 - 2755						
LOCKPORT		1773 – 2031 Newburg, 1890 - SW at 1909			Newburg, 2834 - Block water at 2977	Newburg, 2800 - SG & SO at 2804 Block water at 2816					
ALBION	RED MEDINA (GRIMSBY)	Thorold, 2079 – Grimsby, 2085 -			3249 – SG at 3256	3092 – 3110 10 Mcf gas at 3095					
	WHITE MEDINA (WHIRLPOOL)	Cabothead, 2188 - SG at 2188 Whirlpool, 2225 -			3267 – SO at 3267						
QUEENSTON		2238 –			3370 –						
TOTAL DEPTH		4741	2605	2691	3380	3160	7039	8635	8406	7505	7776
DEEPEST FORMATION REACHED		Gatesburg	Helderberg	Helderberg	Queenston	Albion	Oriskany	Helderberg	Onondaga	Oriskany	Helderberg
RESULT		Lorraine, 3200 - Utica, 3782 – Trenton, 3950 - SG at 4119 - 4241 Gatesburg, 4703 - SW at 4715 - 23 Abandoned	95 gals SW in 14 hrs Completed as SW well for commercial company	Show of oil and salt water at 2691 Abandoned	2200 Mcf gas AF RP 950 psi 7 days	403 Mcf gas AF 40 bbls SW 2860 - 2870 Discovery Well	4800 Mcf gas AF RP 3450 psi 162 hrs Discovery Well	319 Mcf gas AF RP 3320 psi 119 hrs	Dry Abandoned	SW in Oriskany AF. Plugged back to 3037 to frac Bradford 315 Mcf gas AF RP 1140 psi 68 hrs	1992 Mcf gas AF RP 3300 psi 46 hrs.

TABLE 10
SHEET 10

SUMMARIZED RECORDS OF DEEP WELLS (continued)

COUNTY		Indiana	Indiana	Indiana	Indiana	Indiana	Indiana	Jefferson	Luzerne	Mercer	Mercer
MAP NUMBER		91	92	93	94	95	96	97	98	99	100
NAME OF WELL		E.E.Dible 1	R S Uncaphor 1	O M Watson 1	Alex Bennett 1	Dora Maidenburg 1	R&F Mikolic 1	James C White 1	Parvin Good 1	Jamestown Manuf & Mach Co. 1	Vance Partridge 1
OPERATOR		New York State Nat Gas Corp, 6[illegible]	T.W. Phillips Gas & Oil Co.	New York State Nat. Gas Corp, 553	New York State Nat. Gas Corp, 652	Felmont Oil Corp	Sam Jack	Swan-Finch and Keta Gas & Oil Co	United Producing Company, Inc.	Jamestown Manuf & Mach Co	Mercury Oil & Gas Co
TOWNSHIP		Armstrong	Armstrong	Armstrong	Buffington	Brush Valley	Buffington	Gaskill	Dorrance	Jamestown Boro.	Perry
QUADRANGLE		Elders Ridge 38	Elders Ridge 39	Elders Ridge 40	Barnesboro 14	New Florence 12	New Florence 13	Punxsutawney 34	Wilkes Barre 1	Shenango 6	Stoneboro 6
LATITUDE		6800 ft. N 40° 35′	8300 ft. N. 40° 35′	5000 ft. N 40° 35′	7400 ft. N 40° 30′	8200 ft. S 40° 30′	600 ft. S. 40° 30′	3000 ft. S 40° 55′	13,200 ft. S. 41° 10′	7150 ft. S. 41° 30′	3300 ft. N. 41° 25′
LONGITUDE		10,200 ft. W 79° 15′	1600 ft W 79° 15′	5050 ft W 79° 15′	5600 ft E 79° 00′	8400 ft W 79° 00′	1100 ft W. 79° 00′	9200 ft W 78° 50′	2300 ft E 76° 00′	4350 ft W 80° 25′	9250 ft. E 80° 10′
DATE COMPLETED		3 - 12 - 59	5 - 1 - 59	6 - 22 - 59	3 - 14 - 59	1 - 3 - 59	3 - 23 - 59	3 - 19 - 59	8 - 15 - 59	7 - 6 - 59	11 - 20 - 59
ELEVATION		1382 G	1382	1448	2027 G	1483	1917 G	1852	1070 DF	994 DF	1353
TULLY		7109 -	7060 - 7143	7064 -	7482 -	7055 - 7105	7227 -	6738 -	3295 - 3485		
ONONDAGA		7649 - Chert, 7664 -	7663 - Chert, 7672 -	7661 - Chert, 7678 -	8328 - Chert 8342 - SG and SW	7785 - Chert, 7798 -	8000 - Chert, 8010 -	7410 - Chert, 7427 -		2831 -	3535 -
ORISKANY		7809 - 7823 Gas, 7809 - 7813	7800 -	7805 - 7828 Gas, 7805 - 7811			8125 - 8144 Gas, 8126 - 27	7488 - 11 Mcf gas at 7491	sandstone absent	3040 - SW at 3060	3706 - SW at 3710
HELDERBERG									Helderberg - Keyser 5967 - 6082		
SALINA									Tonoloway, 6082-6160 Wills Creek, 6160-6655 Bloomsburg, 6655-7140		
LOCKPORT									McKenzie, 7140-7233 Keefer, 7233-7256		
ALBION	RED MEDINA (GRIMSBY)										
	WHITE MEDINA (WHIRLPOOL)										
QUEENSTON											
TOTAL DEPTH		7825	7812	7831	8398	7895	8165	7495	7583	3060	3710
DEEPEST FORMATION REACHED		Helderberg	Oriskany	Helderberg	Onondaga	Onondaga	Helderberg	Oriskany	Rose Hill	Oriskany	Oriskany
RESULT		830 Mcf gas AF RP 3010 psi 6 days	685 Mcf gas AF RP 2250 psi 16 hrs.	493 Mcf gas AF RP 2030 psi 48 hrs.	150 Mcf gas and 1000 ft. salt water at 8393 Abandoned	1050 Mcf gas AF RP 3493 psi 45 hrs.	860 Mcf gas AF RP, BF, 2775 psi 37 hrs.	1107 Mcf gas AF RP 2495 psi 7 days	Dry	Dry Abandoned	Dry Abandoned

TABLE 10
SHEET 11

SUMMARIZED RECORDS OF DEEP WELLS (continued)

COUNTY		Pike	Potter	Potter	Potter	Potter	Potter	Potter	Somerset	Somerset	Somerset
MAP NUMBER		101	102	103	104	105	106	107	108	109	110
NAME OF WELL		Jennie Haag 1	Ida M Olson 1	Pa Tract 71 3	Pa Tract 81 1	Pa Tract 81 2	Pa Tract 81 3	Pa Tract 82 1	Pa Tract 75 3	M H Critchfield 1	R M Hamer 1
OPERATOR		Transcontinental Production Co.	Godfrey L Cabot, Inc	New York State Nat Gas Corp, 705	Phillips Petroleum Co	Phillips Petroleum Co.	Phillips Petroleum Co	Phillips Petroleum Co	The Peoples Nat. Gas Co	Felmont Oil Corp and Peoples Nat Gas Co.	Felmont Oil Corp. and Peoples Nat. Gas Co.
TOWNSHIP		Greene	Stewardson	Stewardson	Stewardson	Stewordson	Stewardson	Abbott	Jefferson	Jenner	Lincoln
QUADRANGLE		Ariel 1	Galeton 36	Galeton 32	Galeton 31	Galeton 33	Galeton 35	Galeton 30	Donegal 23	Somerset 9	Somerset 13
LATITUDE		11,100 ft N 41° 15′	14,450 ft S 41° 35′	12,200 ft S 41° 35′	14,400 ft N 41° 30′	12,400 ft N 41° 30′	12,200 ft N 41° 30′	4500 ft S 41° 35′	12,700 ft S 40° 05′	9300 ft N 40° 05′	4600 ft N 40° 05′
LONGITUDE		3200 ft E 75° 20′	8900 ft W 77° 40′	4200 ft E 77° 40′	6850 ft W 77° 40′	4750 ft W 77° 40′	8400 ft W 77° 40′	7700 ft E 77° 40′	1200 ft W 79° 15′	7100 ft E 79° 05′	4900 ft E 79° 05′
DATE COMPLETED		7 - 22 - 59	11 - 14 - 59	5 - 26 - 59	1 - 9 - 59	7 - 15 - 59	9 - 11 - 59	2 - 6 - 59	5 - 19 - 59	7 - 16 - 59	7 - 30 - 59
ELEVATION		1575	2076 DF	2032 G	2166 G	1972 DF	1905 DF	2113	2916 G	2122 DF	1934 DF
TULLY		5680 -	6055 -	5545 -	5885 -	5562 - 5640	5541 - 5620	6155 - 6240	Hamilton, 7717 -	7482 - 7590	Hamilton, 7335 -
ONONDAGA			6956 -	6418 -	6723 -	7315 - 7365	6359 -	7034 -	8440 - Chert, 8460 - Gas, 8472 - 74	8370 - Chert, 8389 -	8142 - Chert, 8165 -
ORISKANY			6975 - 7003	6438 - 6465	6746 - SG 6744 - 6774	7365 - 7430	6376 - Gas, 6378 - 6381	Horizon, 7065 -		8517 -	8275 - Gas, 8275, 8340
HELDERBERG											8372 -
SALINA											
LOCKPORT											
ALBION	RED MEDINA (GRIMSBY)										
	WHITE MEDINA (WHIRLPOOL)										
QUEENSTON											
TOTAL DEPTH		5990	7005	6538	6774	7500	6416	7100	8474	8540	8400
DEEPEST FORMATION REACHED		Hamilton	Helderberg	Helderberg	Oriskany	Helderberg	Helderberg	Helderberg	Onondaga	Oriskany	Helderberg
RESULT		Dry	Dry Abandoned	Dry	983 Mcf gas A F RP 4427 psi 24 hrs Discovery Well	Dry	316 Mcf gas A F RP 3100 psi 72 hrs	Dry	10,933 Mcf gas, natural RP 3400 psi 10 days Discovery Well	5030 Mcf gas A F RP 3890 psi 7 days	3391 Mcf gas A F RP 3416 psi 68 hrs PB to 8340

TABLE 10
SHEET 12

SUMMARIZED RECORDS OF DEEP WELLS (continued)

COUNTY	Somerset	Somerset	Somerset	Somerset	Susquehanna	Tioga	Warren	Wayne	Wayne	Westmoreland
MAP NUMBER	111	112	113	114	115	116	117	118	119	120
NAME OF WELL	G.A McConaughy 1	L. W. Walker 1	R.S. Warnick 1	Ellis Friedline 1	E. J. Moran 1	Van Tine 1	Fenner Lindbloom 1	H. Heitmann 1	Grimm 1	J.S. Blair 2
OPERATOR	Felmont Oil Corp. and Peoples Nat. Gas Co.	Peoples Nat. Gas Co. and Snee & Eberly	Felmont Oil Corp. and Peoples Nat. Gas Co.	Felmont Oil Corp.	Kewanee Oil Co.	Ward Denman	T.D. Mallory et al	Transcontinental Production Co.	Transcontinental Production Co	The Peoples Nat. Gas Co.
TOWNSHIP	Jenner	Jenner	Quemahoning	Jenner	Friendsville Boro	Gaines	Glade	Manchester	Dyberry	Donegal
QUADRANGLE	Somerset 12	Somerset 10	Somerset 11	Somerset 14	LeRaysville 4	Goleton 34	Warren 9	Long Eddy 1	Honesdale 1	Donegal 22
LATITUDE	11,400 ft. S. 40° 10'	11,300 ft. N. 40° 10'	3700 ft. N. 40° 05'	7750 ft. S. 40° 10'	2200 ft. N. 41° 55'	11,100 ft. N. 41° 40'	11,400 ft. S. 41° 55'	7750 ft. S. 41° 50'	11,750 ft. S. 41° 40'	8550 ft. N. 40° 05'
LONGITUDE	9800 ft. W. 79° 00'	4450 ft. W. 79° 05'	7400 ft. W. 79° 00'	6700 ft. W 79° 00'	7500 ft. E. 76° 05'	5200 ft. W. 79° 35'	5000 ft. W. 79° 00'	800 ft. E. 75° 10'	7400 ft. W. 75° 15'	5350 ft. W. 79° 15'
DATE COMPLETED	6 - 19 - 59	4 - 23 - 59	4 - 8 - 59	12 - 21 - 59	12 - 12 - 59	10 - 2 - 59	6 - 10 - 59	8 - 12 - 59	3 - 30 - 59	3 - 5 - 59
ELEVATION	2091 G	2554	1938 DF	2037 RT	1447	1677 DF	2029 DF	1077 G	1363	2186
TULLY	Hamilton, 7575-	Hamilton, 7210-	Hamilton, 7810 -	Hamilton 7620 -	3266 - 3386	4567 -	4136-	4645 - 4671	4882 -	Hamilton, 6530-
ONONDAGA	8441- Chert, 8458-	7945 - Chert, 7965 - 242 Mcf gas	8665 - Chert, 8690-	8426 - Chert, 8443 -	5310 - 5415	5428 -	4410-			7166 - Chert, 7188
ORISKANY	8617-	8098 - 454 Mcf gas	8797 - 40 Mcf gas	8580 - 350 Mcf gas 8584 - 8586	5526 - 5542 SG	5450 - 5461	4483 - 4491			7335 -
HELDERBERG										
SALINA										
LOCKPORT										
ALBION RED MEDINA (GRIMSBY)										
WHITE MEDINA (WHIRLPOOL)										
QUEENSTON										
TOTAL DEPTH	8642	8130	8808	8650	5576	5477	4571	4990	4963	7384
DEEPEST FORMATION REACHED	Oriskany	Oriskany	Oriskany	Oriskany	Helderberg	Helderberg	Cobleskill	Hamilton	Hamilton	Oriskany
RESULT	4792 Mcf gas AF RP 3469 psi 68 hrs.	5669 Mcf gas AF RP 3050 psi 10 days	189 Mcf gas AF RP 2839 psi 7 days Discovery Well	2000 Mcf gas AF RP 3050 psi 17 hrs.	Show of gas Abandoned	Dry	Dry	Dry	Dry	9910 Mcf gas AF RP 3270 psi 24 hrs.

TABLE 10
SHEET 13

SUMMARIZED RECORDS OF DEEP WELLS (continued)

COUNTY		Westmoreland	Westmoreland								
MAP NUMBER		121	122								
NAME OF WELL		J.S. Blair 3	H.A. Byers 1								
OPERATOR		The Peoples Nat. Gas Co	Columbian Carbon Co								
TOWNSHIP		Donegal	Cook								
QUADRANGLE		Donegal 24	Donegal 25								
LATITUDE		16,700 ft. S. 40° 10'	13,600 ft. N 40° 05'								
LONGITUDE		3100 ft. W. 79° 15'	1900 ft W. 79° 15'								
DATE COMPLETED		9 -18 -59	10 - 6 - 59								
ELEVATION		2438	2475 G								
TULLY		Hamilton, 7035 -	6573-								
ONONDAGA		7665 - Chert, 7681-	7688 - Chert, 7710 - SG, 7710-7720								
ORISKANY		7829 -	7837 -								
HELDERBERG			7952 -								
SALINA											
LOCKPORT											
ALBION	RED MEDINA (GRIMSBY)										
	WHITE MEDINA (WHIRLPOOL)										
QUEENSTON											
TOTAL DEPTH		7854	8026								
DEEPEST FORMATION REACHED		Oriskany	Helderberg								
RESULT		2144 Mcf gas AF RP 3185 psi 24 hrs.	4108 Mcf gas AF RP 3400 psi 24 hrs.								

TABLE 11

Supplement to Catalogue of Deep Well Samples

(Information Circular No. 16)

January, 1959 to January, 1960

WELL DATA					SAMPLE DATA						
COUNTY Quadrangle & No.	Operator	Farm Name	Total Depth	Year Compl.	Depth Interval		Geologic Interval		Geophysical Data Drillers Logs	Missing Intervals	Remarks, Published Descriptions, Etc.
					From	To	From	To			
ARMSTRONG Elders Ridge 35	Columbian Carbon	Margaret Ruppert #1	7176	58	6000	7179	Dun	Dh	drillers log, gamma ray, laterolog & microlaterolog 6800-7164		
BUTLER Zelienople 7	T.W.Phillips Gas & Oil	C.W. & F.R. Griffen Bros.	5561	59	1041	5567	Mp	Dor		not determined	
CENTRE Philipsburg 2	Bald Eagle Dr.Co.	Erhard #1	6975	54	642	2088	Dun	Dun			
CLEARFIELD Clearfield 33	**Manufacturers Light & Heat**	Pa. Tract 69 #1	7011	57	6935	6985	Dhm	Don	gamma ray log 1200-7010, temp. log 6450-7010	not determined	
Penfield 108	N.Y.State Nat.Gas	Pa. Tract 62 #1	7172	58	7080	7173	Dhm	Dor	drillers log		
Penfield 161	F.C.Deemer	Baker Run Reserve #9	7548	58	7300	7537	Dhm	Dor	drillers log		
Punxsutawney 33	F. C. Deemer	Slimmer #1 (#8)	7228	59	6000	7228	Dun	Dh	drillers log		
COLUMBIA Catawissa 1	Farmers Oil & Gas	Knarr #1	7445	57	130	7442	Dck	Stw	gamma ray-neutron log 0-7008	not determined	faulting repeats part of Dhm
CRAWFORD Girard 32	Pa. Gas Co. #1572	Conneaut Valley Farms #1	3537	59	0	3537	Dun	Oq	drillers log	not determined	

WELL DATA					SAMPLE DATA						
COUNTY Quadrangle & No.	Operator	Farm Name	Total Depth	Year Compl.	Depth Interval		Geologic Interval		Geophysical Data Drillers Logs	Missing Intervals	Remarks, Published Descriptions, Etc.
					From	To	From	To			
CRAWFORD Linesville 14	Benedum & Ark.-La. Gas Co.	J. Kardosh #1	8030	58	2860	8030	Don	PC	gamma ray-neutron log 90-8030	3600-10	first deep well in Pa. to reach "basement"
ELK Clearfield 43	Shell Oil Co.	Pa. Tract 83 #1	6588	59	50	6587	Dun	Dh	drillers log, gamma ray-neutron log 150-6588, laterolog 970-6585, microlog & microcaliper log 5650-6586, sonic log 5600-6580	5940-60, 6100-10, 6487-6555	Core available 6485-6555
Ridgway 2	Fairman Drilling Co.	Kaull & Hall #1	7020	59	1307	7012	Dun	Dh		not determined	
ERIE Fairview 3	N.Y. State Nat. Gas	Pa. Dept. Forests & Waters Block 1, #1	5098	58	11	5098	Dun	Cg	drillers log	44-65, 313-22 1162-69, 1203-04 1661-63, 1792-98 1832-37, 1987-92, 2345-50, 3925-30	unpublished sample description
Girard 31	Paul Britton et al	Carl Huston #1	3380	59	1000	3380	Dun	Oq		not determined	
Northeast 22	J. Pitonyak et al	Henderson #1	2605	59	40	2605	Dun	Scb		not determined	
North of Northeast	N.Y. State Nat. Gas	Pa. Block 2-#1	4741	59	185	4741	Dun	Cq	gamma ray-neutron-temp. log 100-4742	not determined	unpublished sample description
GREENE Waynesburg 1	John T. Galey	Nancy A. Herrington #1	8067	not compl	510	8065	Pm	Dh		not determined	

WELL DATA					SAMPLE DATA						
COUNTY Quadrangle & No.	Operator	Farm Name	Total Depth	Year Compl.	Depth Interval		Geologic Interval		Geophysical Data Drillers Logs	Missing Intervals	Remarks, Published Descriptions, Etc.
					From	To	From	To			
LACKAWANNA Scranton 1	Transcontinental Prod. Co.	Geo.B. Schreiber #1	5532	59	595	5528	Dck	Dun	drillers log, gamma ray-neutron log 0-5404	2421-23, 2764-2836 all missing intervals not determined	
LUZERNE Harvey Lake 1	Farmers Gas & Oil	Goodwin #1	4757	58	642	4032	Dck	Dun			
PIKE Ariel 1	Transcontinental Prod. Co.	Jennie Haag #1	5990	59	21	5980	Dck	Dhm	drillers log, gamma-ray-neutron log 100-5975	not determined	
POTTER Galeton 30	Phillips Petroleum	Pa. Tract 82 #1	7100	59	0	7095	Mp	Dh	drillers log, gamma-ray 0-7086, neutron log 6000-7095	270-80, 370-80, 900-10, 1000-1800, 1840-50, 5490-5500, 5600-10, 5720-30, 6992-93, 6996-98, 7002-04, 7012-14, 7044-45, 7058-60, 7076-78	
Galeton 31	Phillips Petroleum	Pa. Tract 81 #1	6774	59	298	6774	Dun?	Dor	drillers log	328-38, 388-98, 428-38, 448-68, 488-98, 518-28, 588-98, 638-778, 998-1020, 2890-2900 3010-20, 4800-10, 5660-65, 5670-75, 5795-5800, 6145-50 6290-95, 6620-25, 6730-46	

WELL DATA					SAMPLE DATA						
COUNTY Quadrangle & No.	Operator	Farm Name	Total Depth	Year Compl.	Depth Interval		Geologic Interval		Geophysical Data Drillers Logs	Missing Intervals	Remarks, Published Descriptions, Etc.
					From	To	From	To			
SOMERSET											
Donegal 18	Peoples Nat.Gas	Pa. Tract 75 #1	7936	58	40	3240	Mp	Dun	drillers log, gamma ray-neutron log 100-7924	900-30, 960-70. 1340-50, 2040-50, 2180-2250, 2270-2420, 2470-2540, 2600-10 2740-50, 2780-90, 2800-10, 3000-60	
Grantsville 1	Manufacturers Light & Heat	Milton E. Bender #1	8571	58	0	8571	Pp	Dh	gamma ray-neutron log 0-8575, laterolog & micro-laterolog 8400-8570, temp. log 700-8432	890-910, 930-50, 1180-90, 2450-60, 3380-3520, 3830-40 4010-20, 4070-4140, 4150-70, 4590-4600 4670-90, 4930-40, 4950-70, 5550-60, 5890-5900, 6370-80 6600-10, 6740-50 7245-50, 7810-20	
Myersdale 1	N.Y. State Nat.Gas	Pa. Tract 64 #1	9198	58	0	9198	Pa	Dh	drillers log, gamma ray-neutron log 235-9197, caliper log 900-9197	not determined	
Somerset 6	Peoples Nat.Gas & Snee & Eberly	C.E.Williams #2	8260	58	40	8260	Mp	Dh	drillers log, gamma ray-neutron log 80-8260	not determined	
Somerset 7	Felmont & Peoples Nat. Gas	Royal Rhoads #1	8450	58	70	8445	Pa	Don	drillers log, gamma ray-neutron log 50-8260		

WELL DATA					SAMPLE DATA						
COUNTY Quadrangle & No.	Operator	Farm Name	Total Depth	Year Compl.	Depth Interval		Geologic Interval		Geophysical Data Drillers Logs	Missing Intervals	Remarks, Published Descriptions, Etc.
					From	To	From	To			
WARREN Warren 9	Mallory, et al	Fenner Lindblom #1 (Dr.Lindbloom)	4571	59	400	4512	Dun	Dh	drillers log	4181-4443	
WAYNE Honesdale 1	Transco Production Co. #1	Grimm #1	4963	59	339	4965	Dck	Dhm	drillers log, gamma ray-neutron-temp. log 0-4963	not determined	
Long Eddy 1	Transco Production Co. #1	Heitman, et al #1	4990	59	42	4990?	Dck	Dhm?	drillers log, gamma ray-neutron-temp. log 0-4999	not determined	
WESTMORELAND Donegal 20	Peoples Nat. Gas	James S.Blair #1	7831	58	40	7693	Pp	Don	gamma ray-neutron log 90-7582		

GEOPHYSICAL LOGS

COUNTY Quadrangle & No.	Farm Name	Total Depth	Gamma-ray Log, Geologic Interval	Neutron Log	Other Logs
CLEARFIELD					
Penfield 41	Howard Huey #1	7325	7100-7315 (Dhm-Dor)		temp. log 7160-7315
Penfield 149	Pa. Tract 66 #1	7036	6650-7017 (Dhm-Dor)	6650-7017	temp. log 6650-7017
CLINTON					
Lock Haven 1	Clifford Walizer #1	4532	0-4532 (Ob-Cg)		electric log 1860-4532
Renova West 14	Florence Wyckoff #1	6794	0-6071 (Dck-Dhm)		section gauge 600-6068
CRAWFORD					
Linesville 14	Kardosh #1	8030	100-8030 (Mp-PC)	100-8030	
ELK					
Clearfield 43	Pa. Tract 83 #1	6588	150-6588 (Mp-Dh)	150-6588	laterolog 970-6585 microlaterolog 5650-6586 soniclog 5600-6580
ERIE					
Girard 28	Edna Roberts #1	3265	2758-3215 (Sl - Sa)	2758-3215	
Girard 30	Anna Packan #1 (Korynoski #1)	3160	0-3135 (Dun-Sa)	0-3135	
Offshore-north of Northeast Quad	Pa. Block 2-#1	4741	100-4742 (Dun-Cg)	100-4742	temp. log 100-4742
INDIANA					
New Florence 13	R & F Mikolic #1	8181	7200-8150 (Dt-Dor)		temp. log 7130-8150
LACKAWANNA					
Scranton 1	Geo. B. Schreiber #1	5532	0-5404 (Dck-Dun)	0-5404	
PIKE					
Ariel 1	Jennie Haag #1	5990	100-5975 (Dck-Dhm)	100-5975	
POTTER					
Galeton 33	Pa. Tract 81 #2	7500	5500-7489 (Dt-Dh)		

GEOPHYSICAL LOGS

COUNTY Quadrangle & No.		Farm Name	Total Depth	Gamma-ray Log, Geologic Interval	Neutron Log	Other Logs
SULLIVAN						
Eagles Mere	1	A.W.Bennett #1	12,343	0-12,309 (Dck-Oj)		
Powell	2	Bruschart #1	7192	20-7194 (Dun-Dor?)		electric log 7020-7194
SUSQUEHANNA						
LeRaysville	4	E. J. Moran #1	5576	0-5578 (Dck-Dor?)	0-5578	
WARREN						
Warren	7	Great Lot 74 #1	4668	125-4668 (Dun-Dh)		
WAYNE						
Honesdale	1	Grimm #1	4963	0-4963 (Dck-Dhm)	0-4963	temp. log 0-4963
Long Eddy	1	Heitman et al #1	4990	0-4999 (Dck-Dhm)	0-4999	temp. log 0-4999
WESTMORELAND						
Donegal	25	H.A.Byers #1	8026	7490-8019 (Dhm-Dh)		laterolog 7500-8019 microlaterolog 7300-8025

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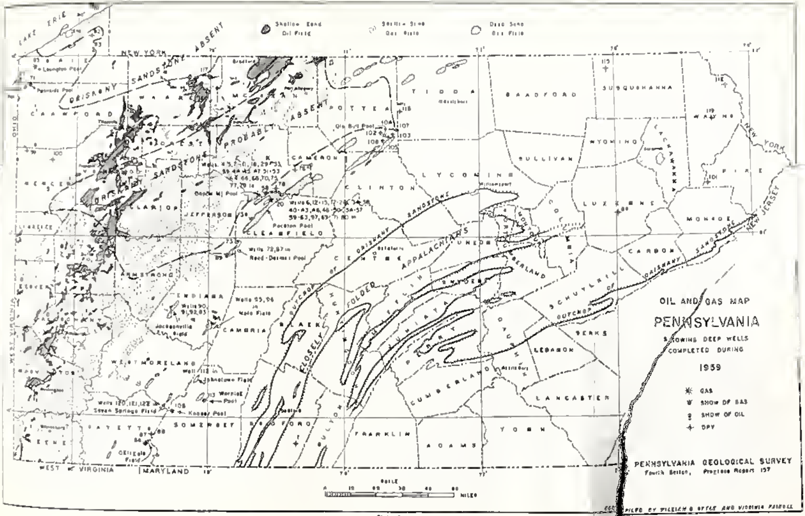

LAKE ERIE
Shallow Sand Oil Field
Shallow Sand Gas Field
Deep Sand Gas Field
NEW YORK
ORISKANY SANDSTONE ABSENT
ORISKANY SANDSTONE PROBABLY ABSENT
OHIO
ERIE
Lexington Pool
CRAWFORD
WARREN
MC KEAN
POTTER
TIOGA
BRADFORD
SUSQUEHANNA
WAYNE
WYOMING
SULLIVAN
LACKAWANNA
PIKE
LYCOMING
MERCER
VENANGO
FOREST
ELK
CAMERON
CLINTON
Ole Bull Pool
Wells 4,5,7-10,18,29-33, 39,44,45,47,51-53, 64,66,68,70,75, 77,78 in
Devils Hill Pool
Wells 6,12-15,17-28,34-38, 40-43,46,48-50,54-57, 59-63,67,69-71,80 in
Pocotan Pool
CLARION
JEFFERSON
CLEARFIELD
LAWRENCE
BUTLER
Wells 72,87 in
Reed-Dermer Pool
CENTRE
LUZERNE
COLUMBIA
MONROE
CARBON
UNION
SNYDER
NORTHUMBERLAND
SCHUYLKILL
NEW JERSEY
ARMSTRONG
BEAVER
ALLEGHENY
INDIANA
Wells 90, 91,92,93
Jacksonville Gas Field
Wells 95,96 in
Nolo Field
CAMBRIA
BLAIR
HUNTINGDON
MIFFLIN
JUNIATA
PERRY
DAUPHIN
LEBANON
BERKS
OUTCROP OF ORISKANY SANDSTONE
CLOSELY FOLDED APPALACHIANS
WESTMORELAND
WASHINGTON
Well 112 in
Johnstown Field
Wernick Pool
Wells 120,121,122 in
Seven Springs Field
Kooser Pool
GREENE
FAYETTE
SOMERSET
BEDFORD
FULTON
FRANKLIN
ADAMS
YORK
CUMBERLAND
LANCASTER
Ohiopyle Field
WEST VIRGINIA
MARYLAND
SCALE
0 10 20 30 40 50 MILES
OIL AND GAS MAP
PENNSYLVANIA
SHOWING DEEP WELLS
COMPLETED DURING
1959
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